

THE RAILWAY GAZETTE

Price: Two Shillings

FRIDAY, SEPTEMBER 8, 1961

Annually £5 by post

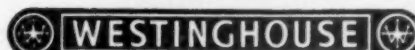
Power to Stop gives Freedom to Speed



Brakes designed and made in England by
WESTINGHOUSE BRAKE AND SIGNAL CO. LTD.
82 YORK WAY, KING'S CROSS, LONDON, N.1

The new Diesel Electric Pullman Trains
built by Metropolitan-Cammell Carriage and Wagon Co. Ltd.
for the Pullman Car Co. Ltd.

are fitted with the



TWO-STAGE ELECTRO-PNEUMATIC HIGH-SPEED BRAKE

the modern brake system which automatically
provides increased braking pressures at high speeds.

BELFORT

*... the real wood
veneer laminate with
the melamine surface*



Belfort Afrormosia used for panelling in the new Railway Coaches. Photograph reproduced by permission of London Midland Region, British Railways.

Designers have for centuries found that fine woods are the well-tested medium of their art.

In the field of design "Belfort," with its superb appearance and durable surface qualities is available in an extensive range of woods to appeal aesthetically to interior designers and railway carriage builders.

"Belfort" is ideally suited for every application where decorative wood surfaces are required.

"Belfort" laminates are available in panels 8' x 4' and in two thicknesses, 1/4" and 3/8"



For descriptive literature and samples, please write to the main Railway Distributors:

W. A. BONNELL (1924) LTD., 8 WESTMINSTER PALACE GARDENS, ARTILLERY ROW, LONDON, S.W.1 ABBey 1061

BELFORT

Heat resistant

Stain resistant

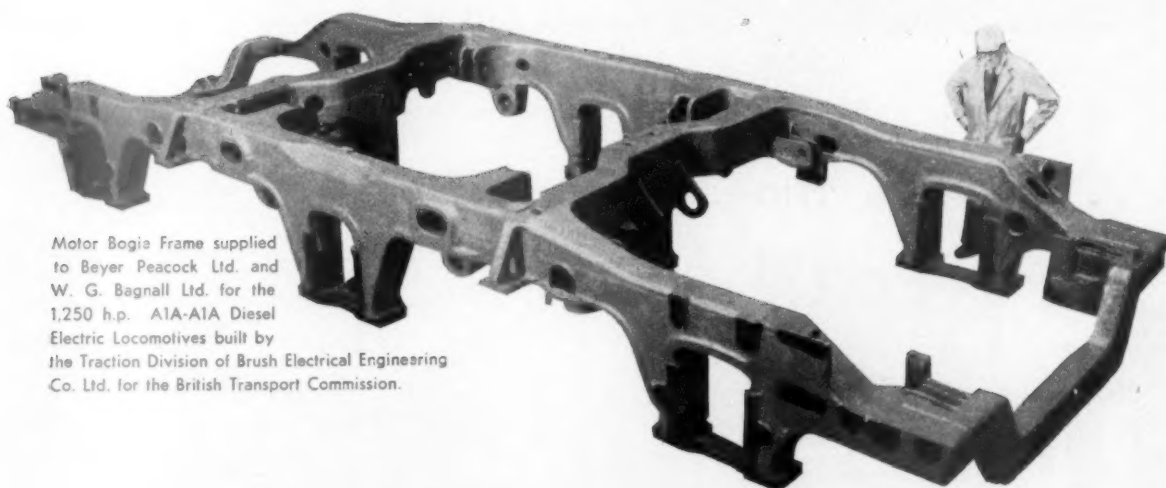
BONDED LAMINATES LIMITED

C. H. N. VENEER MILLS, CHISENHALE ROAD, LONDON, E.3 · Phone: Advance 2005

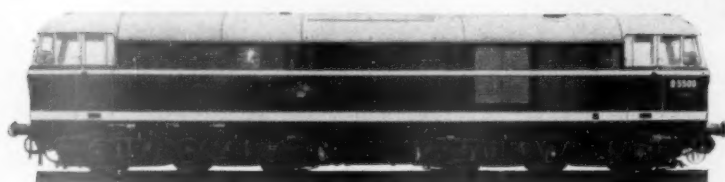




**a sound foundation
for trouble free
service**



Motor Bogie Frame supplied to Beyer Peacock Ltd. and W. G. Bagnall Ltd. for the 1,250 h.p. A1A-A1A Diesel Electric Locomotives built by the Traction Division of Brush Electrical Engineering Co. Ltd. for the British Transport Commission.



One piece cast steel BOGIES

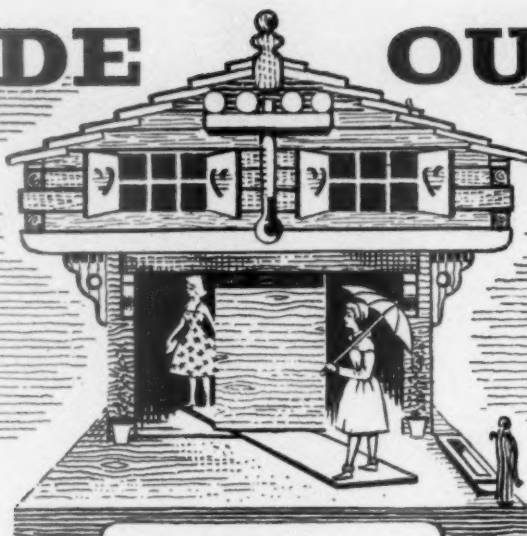
The design combines maximum strength with minimum weight. ESC "Commonwealth" bogies give smooth easy riding at all speeds and require the minimum of maintenance, ensuring maximum locomotive availability.

**ENGLISH STEEL
CASTINGS CORPORATION LTD**

River Don Works, Sheffield

A WHOLLY OWNED SUBSIDIARY OF ENGLISH STEEL CORPORATION LTD.

INSIDE OUTSIDE

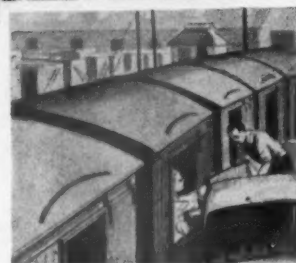


... there's a THOMSON PRODUCT to suit the job



The above photographs of Diesel Rail Cars with "Alhambrinal" panels are by courtesy of British Railways.

"Alhambrinal" is the modern, permanent interior panelling and may be used for body or lining panels, bulkheads, ceiling panels and seat backs in railcars, carriages and public service vehicles.



Double or single-prepared Waterproof Roofings for the outer roofs of Railway Carriages and covered Goods Vans. Also Tarpaulins for open Wagons.

Contractors to the Admiralty, War Office, Colonial Governments, Home and Foreign Railways, Steamship Companies, etc.

THOMAS THOMSON

SONS & CO. (BARRHEAD) LTD.
FERENEZE WORKS,
BARRHEAD, Nr. GLASGOW



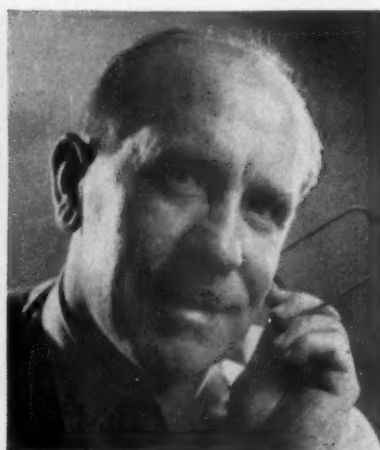
LITERATURE ON REQUEST. We will be glad to send you, without obligation, a booklet containing fuller details of the products mentioned in this advertisement. Samples of "Alhambrinal" and Roofings are also available.



Nuclear Engineering



Steel Works



Shipbuilding



Iron Foundries

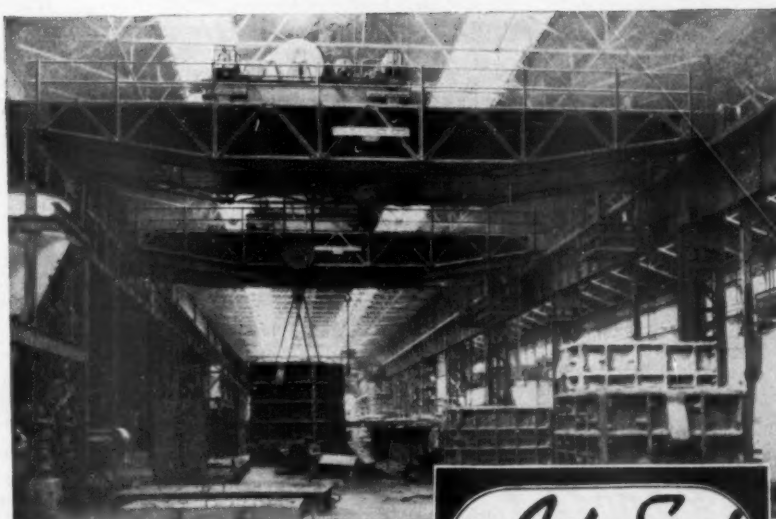


Railways

Whatever your job

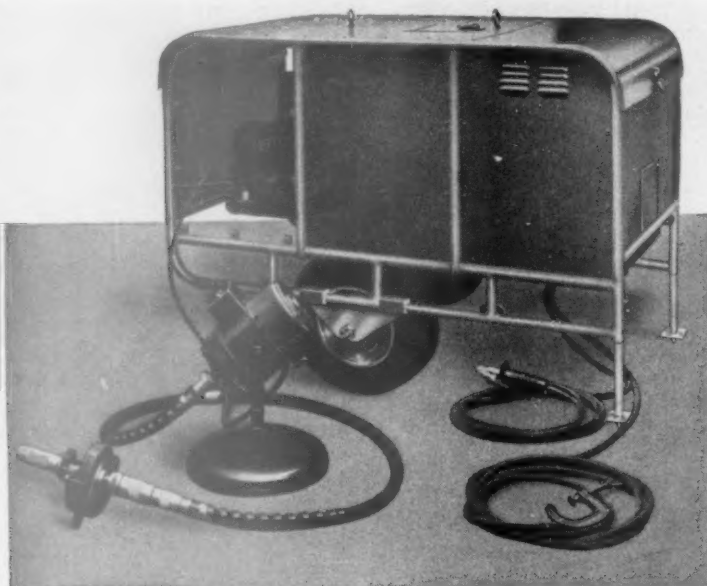
JOHN SMITH
for easier handling!

* REMEMBER, whatever your lifting problem, JOHN SMITHS have an answer.



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portable welding equipment

*for continuous jointing
of long welded rails*

Developed for use with the system originated by British Railways, this lightweight plant comprises a welding generator, a profile grinding machine and a vertical milling machine. It can therefore carry out the entire process of welding in situ, dressing, profile grinding and milling in an average time of 30 minutes per pair of rail joints for two operators.

The welding generator, driven by a governed 25 h.p. air-cooled engine, provides 300A continuous, with a maximum of 400A. Engines can be supplied for running on petrol or propane gas. The auxiliary generator gives 27.3A at 110V d.c. for operating auxiliary equipment. The complete assembly is mounted in a wheeled tubular frame with all controls, the total weight being about 965 lb.

A pair of tubular detachable handles is provided for manœuvring the unit on the site.

After the weld is made, excess metal is removed by a portable Flextol flexible shaft grinder. The Flextol Profile Grinder attachment is then clamped to the rail, and its flexible grinding belt gives a contour accurate within 0.005". The Vertical Milling Attachment then removes from the base of the rail the steel strip used to retain the weld metal.

Whilst primarily intended for jointing rails, the welding plant is equally suitable for other welding work where a high output is required from portable equipment.

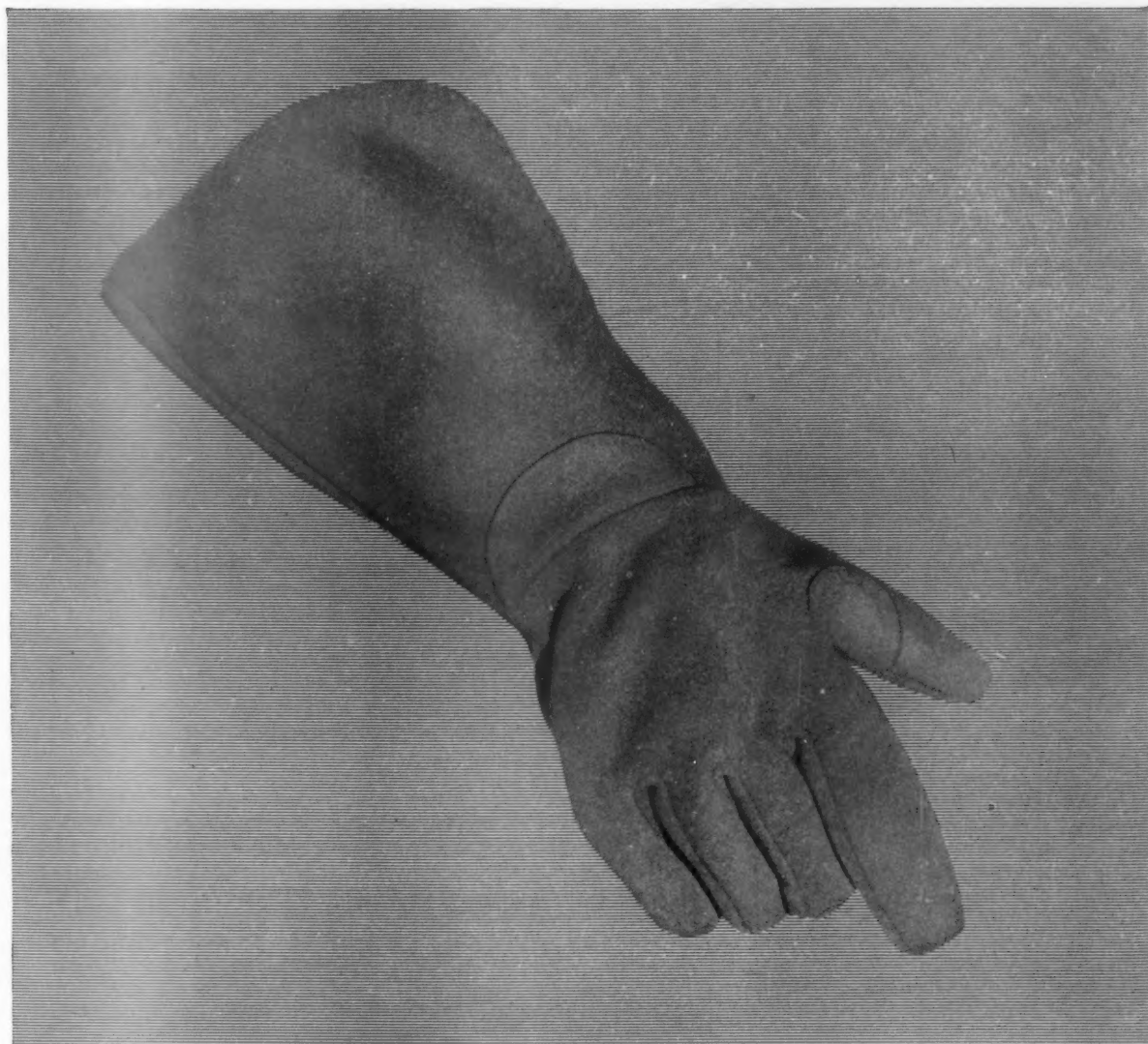


Flextol
POWER TOOLS
Made in England

Full particulars from

FLEXTOL ENGINEERING COMPANY LTD
THE GREEN · EALING · LONDON · W5

Telephone: EALING 6444/7 Telegrams: DOMINATING, EALUX, LONDON



The Right Glove...



Murex chrome leather welding gloves are the right type for welding because they are designed for the job. They provide full protection for the hands and wrists from spatter and they remain supple and comfortable even after long use. All seams are insewn to prevent burning of the thread and all the parts subject to the most wear are reinforced. Various types are available, including the five-finger type, mitt type and long gauntlets. Murex asbestos gloves are also available.

Please write for full particulars.

MUREX WELDING PROCESSES LTD., WALTHAM CROSS, HERTS. Telephone: Waltham Cross 23636

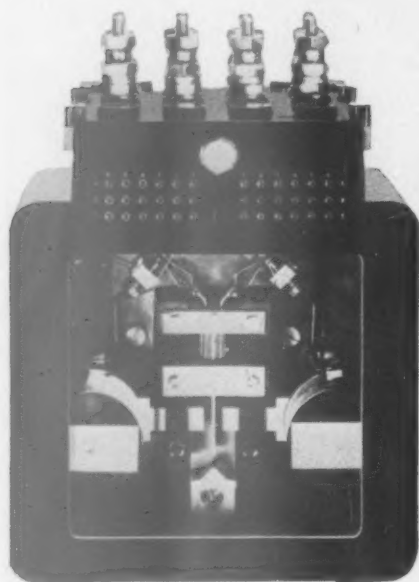
TYER

MOVING IRON

POLARISED D.C. RELAY. TYPE G.I.

**FOR SIGNAL, BLOCK, POINT PROVING AND TELEGRAPH CIRCUITS****conforming generally to the B.R. Specification No. 923****— SENSITIVE — RELIABLE — ECONOMICAL —**

For many years Tyer's A.D. (arm detection) relay has been in vogue on the numerous signalling and telegraph systems of railways at Home and Abroad.

**TYPICAL OPERATION**

2 position, non-stick, 250 ohms
3 position, centre-bias, 1000 ohms

Size

With terminals fitted at top of case: W: $6\frac{5}{8}$ " x H: $7\frac{1}{4}$ " x D: $3\frac{3}{8}$ "
(Weight: $4\frac{1}{2}$ lb.).

With detachable terminal top: (Remax Limited). W: $6\frac{5}{8}$ " x
H: $8\frac{7}{8}$ " x D: $4\frac{1}{4}$ " (Weight: $5\frac{1}{2}$ lb.).

Terminals O.B.A.

Markings: R¹ & R² (Coil)

N (normal contacts) A (Arm) B (Back)

F (Front) R (Reverse).

Coil Extension pieces, adjustable.

Casework: Moulded bakelite, sealed and dustproof, with full-vision inspection window, suitable for wall or shelf mounting.

Magnet pole piece adjustable.

All contacts perfectly balanced in one plane.

Contacts: metal to metal, self-wiping with reliable contact pressure. Each contact limb provided with a keeper.

Contact screws self-securing, with, or without lock nuts.

Flexible connections between contact arms and terminals, capable of carrying 2 amps.

Contact Equipment: 1F/B, 1N/R, 1N, 1R, 2N/R, 2F/B or 1F/B—1N/R

Contact Clearance: Minimum of .02 in.

Contact Rating: 1 ampere continuous

Contact Pressure: N, R or F, approximately 2 grammes with current 50% in excess of P.U. value

Contact Resistance: Max. .25 ohm, with contact carrying .1 amp D.C. and relay energised

(Biased contacts. Max: .25 ohm when relay 10% of P.U. value)

The relay can be supplied with conventional O.B.A. terminals, mounted on a moulded panel incorporated with the main 'base' of the relay unit around which the full-vision glazed cover fits.

The terminal panel includes the terminal identification symbols moulded in relief:—

Coils: R¹ & R². Contacts: N, R, A, B and F.

Alternatively, the Relay can be supplied fitted with a detachable terminal top unit. This unit permits of all conductor leads remaining undisturbed on their O.B.A. terminals whilst the relay is removed for inspection or servicing. By incorporating 'interlocking' and terminal 'configuration' features it is impossible to fit or connect up a relay differing in contact and terminal arrangements. Hence, relays can be disconnected and re-connected without error or technical supervision. Such a unit minimises the time taken to change a relay in service.

TYER & COMPANY LIMITED

Established 1851

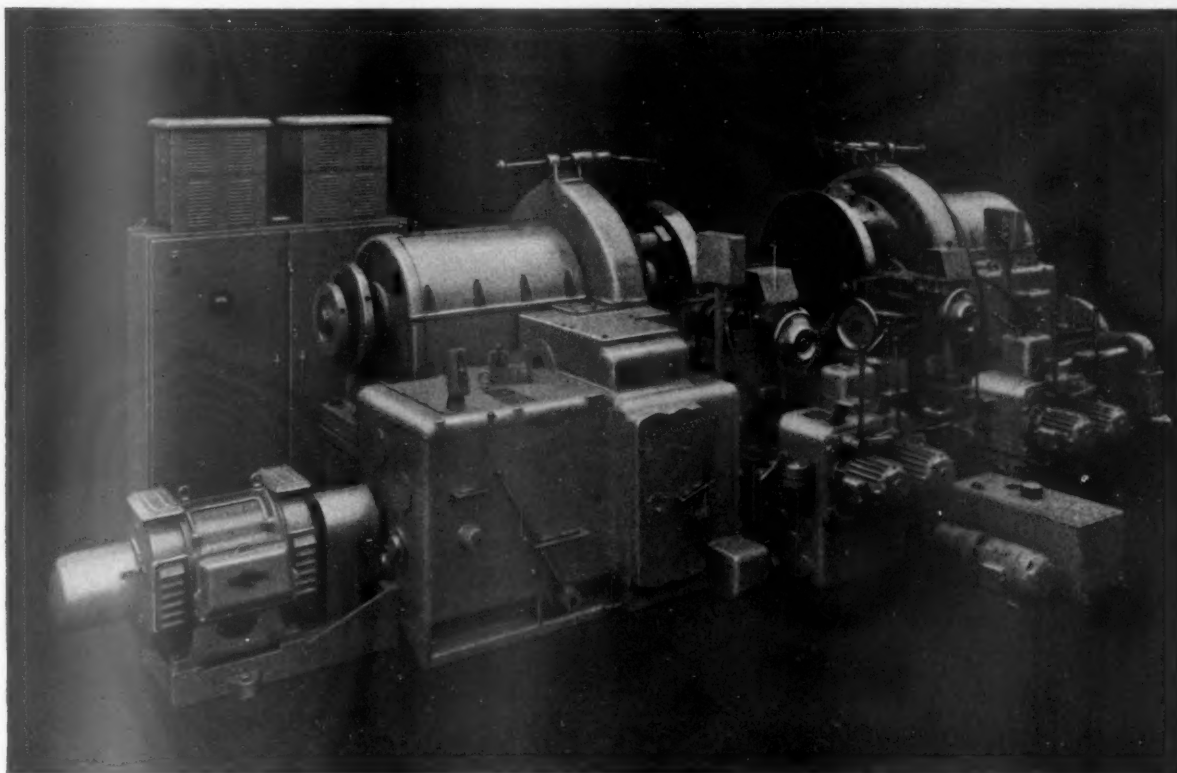
PERRAM WORKS · MERROW SIDING
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(Within the organisation of the Southern Areas Electric Corporation)



MANUFACTURERS OF
RAILWAY SIGNAL AND TELEGRAPH,
ELECTRONIC AND HUMIDITY CONTROL
EQUIPMENT AND ALL TYPES OF
PRECISION APPARATUS

Telephone: Guildford 2211 Telegrams: Switchmen, Guildford



HEAVY DUTY WHEEL LATHES

Our latest model Heavy Duty Wheel Lathe, the 4-ft. size being illustrated here, incorporates all the features which we have developed, as the result of many years' experience, in order to achieve the maximum output possible and at the same time to provide a machine which is economical in tooling and maintenance costs.

The robust construction of the main parts of the lathe can be seen from the photograph and all shafts, bearings, gears, etc., are on equally generous lines. All electrical and mechanical controls are easily accessible and those in constant use are grouped at the operator's position. Loading of the wheel sets is facilitated by the provision

of self-contained jack or hoist, as dictated by the shop layout. When preferred, through type machines can be built on similar lines.

Hydraulically operated drivers are used, in order to ensure speed of operation and equalised driving force to the work. Faceplate arrangements can be modified as required to accommodate wheel sets with non-removable roller bearing axleboxes and we have developed special collets to get the best possible grip on all types of axles. Loading times are further reduced by the incorporation of spring loaded self-adjusting spindle sleeves.

We have for many years taken a leading part in the development of tungsten carbide tools for wheel lathes and the results of this work are utilised on machines both with and without profiling arrangements. Not only can we offer fast cutting times and excellent work, but tooling costs are very economical.

Our patent Hydro-mechanical Profiling Device is very simple and effective. The profile is accurate and setting to each wheel set is easy and quick. A special point is that there is nothing in the equipment which is not within the scope of the maintenance facilities normally available. If a range of profiles is needed, the change from one to another is simple and speedy.

In addition to the type of machine described above, which is built in all sizes from 7 ft. 6 in. down, we have a highly developed Underfloor Type Wheel Lathe for machining wheels *in situ*, roller drive wheel lathes and a very useful range of standard wheel lathes for use where the very maximum output is not required. The latter machines are also capable of journal turning and similar work.

We are always very glad to hear of Railway Engineers' requirements for wheel lathes, so that we may show exactly what we have available to meet individual requirements.

SCOTTISH MACHINE TOOL CORPORATION LTD.

17 Lynedoch Crescent
Glasgow C.3.

DOUGLAS 6586/9

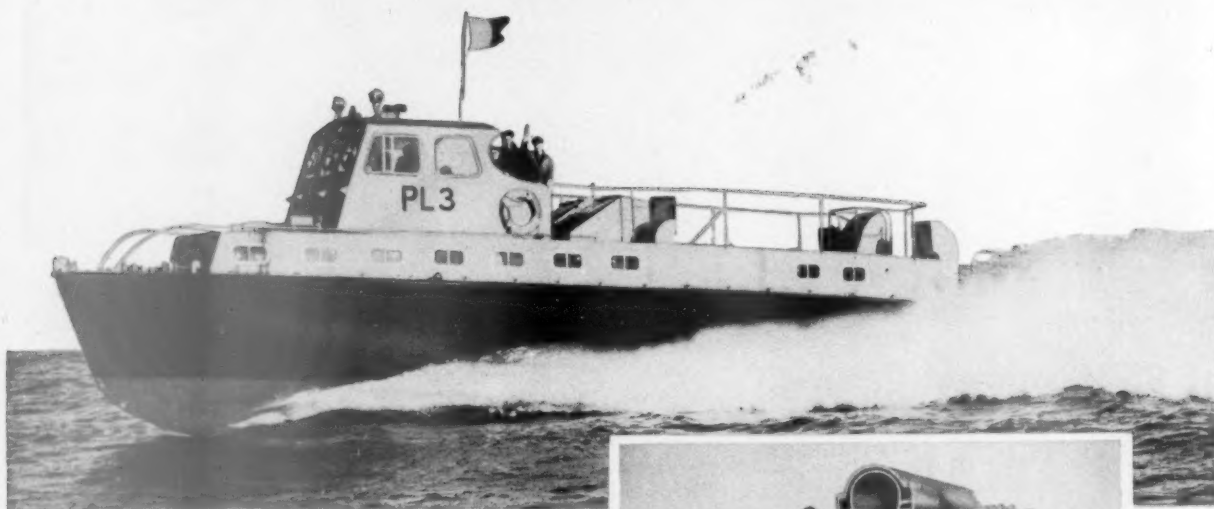
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RICHMOND 7667/9

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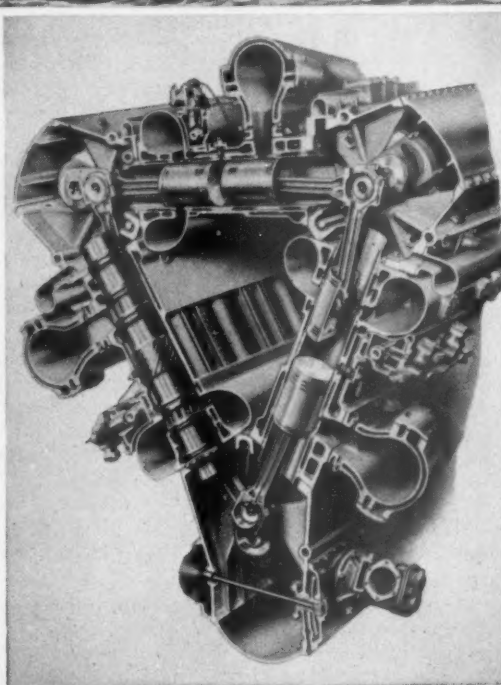
*Yet another successful bearing
application by*

VANDERVELL



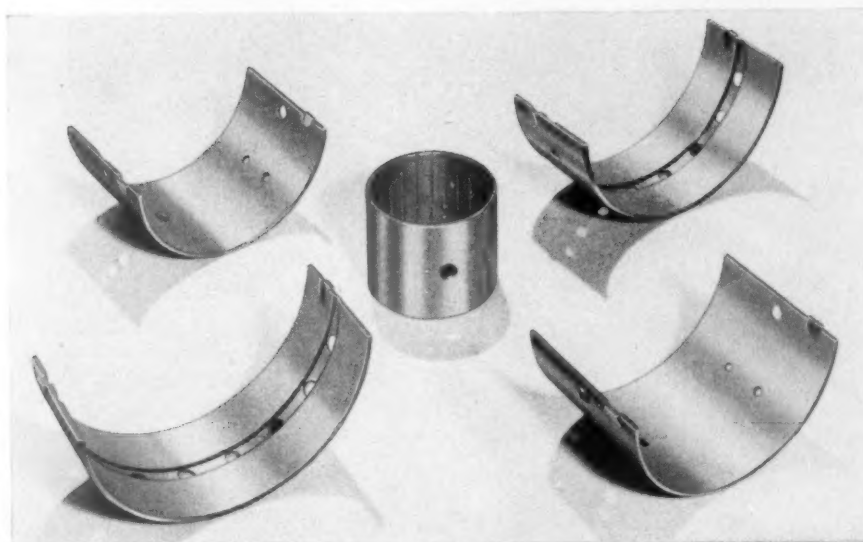
One of the fleet of Superfast Passenger Launches, built by Thornycroft of Southampton for Cia. Shell de Venezuela, which is powered by two Napier Deltic diesel engines, totalling 1,730 shp. These launches carry 46 passengers at 36 mph and are employed on Lake Maracaibo in connection with oil drilling operations.

Section view of Napier Deltic Engine used in the 68 ft Thornycroft Superfast Passenger Launches being used by Cia. Shell de Venezuela.



VANDERVELL PRODUCTS (CANADA) LTD • TORONTO • CANADA

Installed by
NAPIER



These Lead Indium Thin Shell Bearings are approaching 10,000 hours service with the Superfast Thornycroft Passenger Launches, powered by Napier Deltic engines. It again shows the ability of Vandervell Lead Indium Bearings to withstand severe operating conditions, and give longer service with a minimum of maintenance.



VANDERVELL PRODUCTS LTD · WESTERN AVE · ACTON · LONDON W3

Smee's V193

ELECTRICALLY CONTROLLED Railway Sidings



by SUMMERSON'S

This sidings contract for the North West Gas Board, Mersey Group, had to be laid without disturbing existing gas production. As Consulting Engineers working with the Gas Board engineers, Summerson's surveyed and designed the layout and drew up a specification. As main contractors, Summerson's manufactured and installed the track which consisted of two different designs. One, involved 8,100 yards of track which included 41 turnouts, 12 tandem turnouts and 3 single cross overs, the other consisted of 765 yards of fully guarded track for fixing in concrete to top rail level, including a scissors cross over and turnouts. The main coke sidings have electro-pneumatically operated switches to direct wagons which move from the tippler tables by gravity, into the correct road. Just another example of how Summerson's experienced "know how" enables a difficult installation to be successfully carried out.

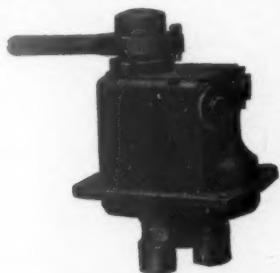
MAIN CONTRACTORS: Thomas Summerson & Sons, Ltd. CIVIL WORK: Leonard Fairclough Ltd. ELECTRO-PNEUMATIC EQUIPMENT: Westinghouse Brake & Signal Co. Ltd.

THOMAS SUMMERSON & SONS, LTD., MOWDEN HALL, DARLINGTON, CO. DURHAM. Telephone: DARLINGTON 5226
London Office: 5a Dean's Yard, S.W.1. Abbey 1365

METCALFE'S

AIR BRAKE EQUIPMENT

for Locomotives



OERLIKON PATENT
DESIGN

TYPE FV.3 An Automatic Driver's Air Brake Control Valve, suitable for medium length goods and passenger trains or railcars, etc. This Valve is simple to operate and of light weight construction. It enables the full benefit to be obtained from modern step-by-step application and release of air brakes. Leaflet A.1.



TYPE FV.4 A standard Driver's Automatic Air Brake Control Valve with automatically controlled high pressure brake releasing impulse. This Valve enables the maximum speed of brake release to be obtained, and in addition enables the full utilisation of all the advantages associated with modern air brakes. The Valve is reliable in service and simple to operate and maintain and is especially suitable for long express passenger and goods trains. Leaflet A.4.



TYPE FD.1 This is a simple Brake Control Valve suitable for direct braking or shunting brake requirements. It is very simple to use and accurate in operation. The type FD.1 Valve can also be adapted for the control of the Diesel engines and can also be made suitable for cam operation. Leaflet A.13.



TYPE LST.1 A locomotive Triple Valve of modern and simple design. The LST.1 Operating Valve embodies a control for freight or passenger train operation, together with a high efficiency Brake relay, also an Anti-skid Brake device may be provided when required. This Valve is capable of controlling the air supply to several Brake Cylinders when required. Leaflet A.2.

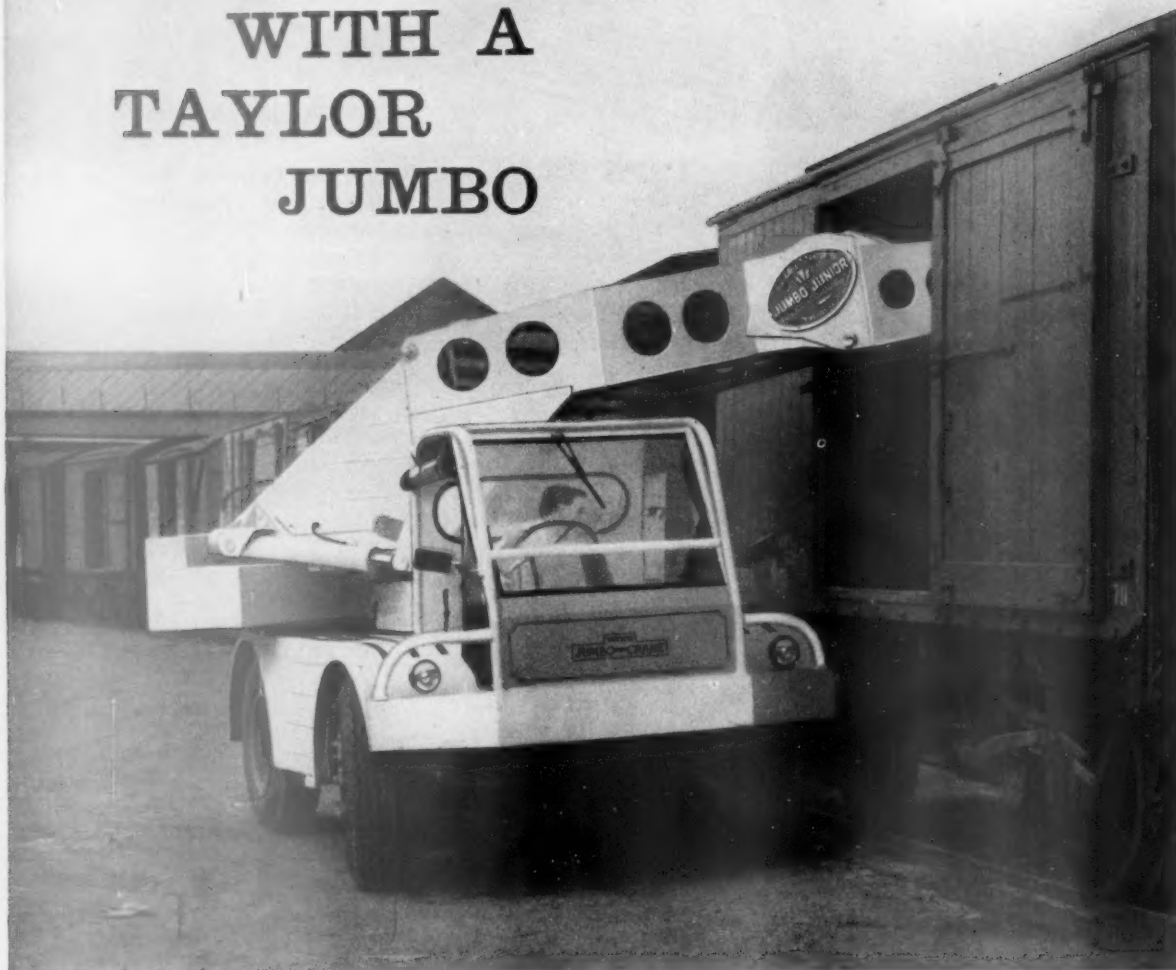
DAVIES & METCALFE LTD.

INJECTOR WORKS · ROMILEY · ENGLAND

Telephone: WOODLEY 2626 (2 lines)

Telegrams: EXHAUST, ROMILEY

GET INTO THE JOB WITH A TAYLOR JUMBO



Excelling under low headroom conditions, completely self-contained, Taylor Jumbo cranes—each a powerful, low cost combination of diesel economy and hydraulic simplicity—are ideally suited to all railway goods handling operations. Speeding truck and wagon turnround... serving all parts of the goods yard... moving materials of every kind with safety and despatch.

Such is their versatility, Taylor Jumbo cranes are kept constantly on the move—perpetually fostering the economies which today's railways demand.

F. TAYLOR & SONS (MANCHESTER) LIMITED.

STEEL HOUSE, EASTCOTE, MIDDLESEX.

SALES AND SERVICE: LONDON, BRISTOL, BIRMINGHAM, MANCHESTER,

LEEDS, NEWCASTLE, GLASGOW.

A MEMBER OF THE STEEL GROUP OF CRANE AND EXCAVATOR MANUFACTURERS

TAYLOR



Mobile Cranes





Photograph: courtesy of Bell Aircraft Corp.

Protection

Early detection and speedy action lessen the damage done by fire. Helicopters are ideal for forest patrols: to spot the beginnings of fire and to rush men in before the blaze can spread.

DOCKERS' PAINTS have given sound protection to rolling stock, vehicles and buildings on the transport systems of the world in all weathers for more than 70 years. DOCKERS are also pioneers in the development and production of the very specialised finishes for aircraft.

HAVE YOU A PROBLEM OF PROTECTION?

Technicians at our Research Laboratories will advise you on any aspect of paint technology, including the choice and methods of application of DOCKERS' PAINTS.

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Tested by Time in every Country under the Sun
Docker Brothers • Ladywood • Birmingham 16 • England
Makers of Paints, Lacquers and Varnishes for Every Purpose

at the heart of railway progress



FEROBESTOS

More railway engineers than ever are using Ferobestos asbestos-reinforced plastics for those small vital wearing components on rolling stock and bogies. Ferobestos components are tough, last longer, and need less maintenance. Ferobestos asbestos-reinforced plastics have many outstanding qualities:

High strength-to-weight ratio

High wear resistance

Excellent dimensional stability

Great physical strength

Low moisture absorption

Good chemical resistance

Low coefficient of friction

High temperature resistance

*For: Centre pivot liners · Rubbing pads · Swing link bushes
Bogie bolster side bearers · Drawgear bushes · King-pin wear sleeves · Horn cheek and axle box liners · Brake gear bushes
Buffer guides · Corridor end facings etc.*

Enquiries for more specialised uses of Ferobestos are welcomed.

FEROBESTOS

asbestos-reinforced plastics

J. W. ROBERTS LTD.

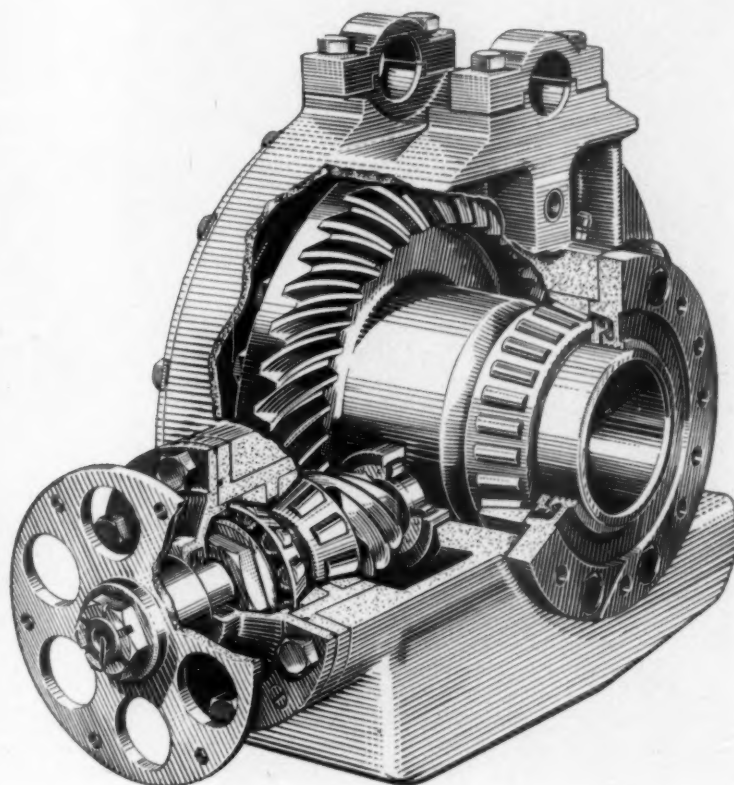
*A Member of the Turner & Newall Organisation,
Cherley New Road, Horwich, Bolton. Tel: Horwich 840.*

BRANCH OFFICES IN LONDON, BIRMINGHAM, GLASGOW, LEEDS.

*Other products include FEROGLAS glass reinforced plastics and
Sprayed LIMPET Asbestos — the all-purpose insulating material.*

ENV

FOR SPIRAL BEVEL AND HYPOID GEARS AND AXLE DRIVES



The right-angle drive, which now has so many applications for diesel and electric traction, is a job for the specialist.

ENV pioneered the spiral bevel and hypoid drives in this country and have over 30 years' experience in the design and manufacture of heavy duty right-angle drives.

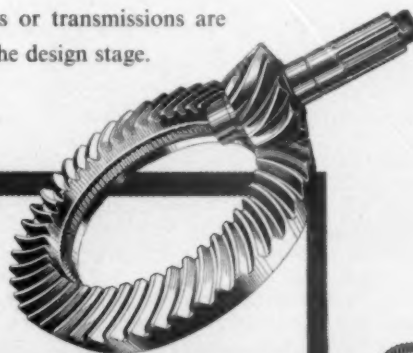
Production facilities include the most modern gear cutting and heat treatment plants, enabling precision spiral bevel and hypoid gears to be supplied with profile ground teeth when required for high speed applications.

Traction engineers and designers who need right-angle gears or transmissions are invited to communicate with ENV Technical Department at the design stage.

ENV

**FOR
GEARS**

*Spiral Bevel
Gear*



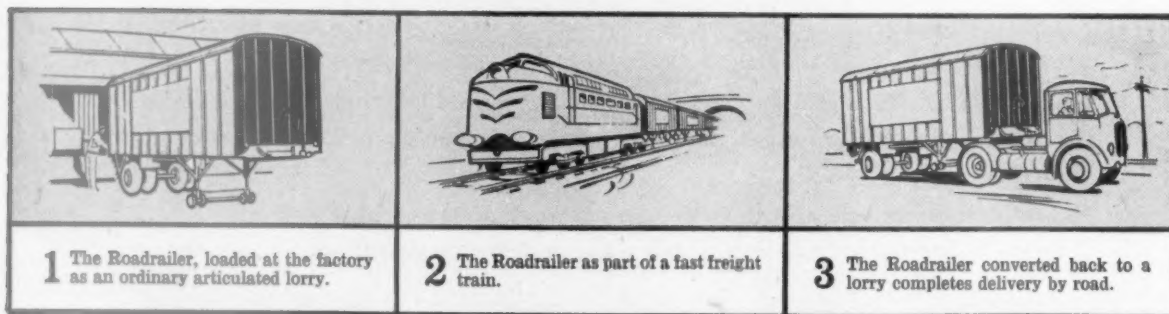
E.N.V. ENGINEERING COMPANY LIMITED, HYTHE ROAD, WILLESDEN, LONDON, N.W.10. Telephone: LADBroke 3622



AP 113



*This lorry... could be up there
if only it were a Roadrailer!*



What have roads got that railways haven't? Door-to-door service on the same vehicle. They also have something else—traffic jams! These can make a potentially fast service into a frustratingly slow one.

The railway's fundamental equipment is the permanent way and on direct hauls it is the cheapest form of overland transport. To neglect its clear-cut advantages on long and medium trunk hauls does not make sense.

Now the Roadrailer gives the obvious

answer. It is a road vehicle that is transferred on to the permanent way in 150 seconds by letting down rail wheels. It can be adapted for any traffic including liquids, timber, cement. It coddles its loads with a suspension so smooth that a threepenny bit has been made to stand on edge at 65 m.p.h.

Feed railheads by road; trunk between railheads by rail. That makes sense. And now the Roadrailer can achieve it as a practical, profitable proposition.



PRESSED STEEL CO. LTD.

*Railway Division,
Linwood Factory, Paisley, Scotland*

LONDON OFFICE: Railway Division, 47 Victoria St., London, S.W.1. HEAD OFFICE: Cowley, Oxford. BRUSSELS OFFICE: 2301/2307 Centre International Rogier, Passage International 6, Brussels 1, Belgium. Manufacturers of car bodies, Prestcold refrigeration equipment, all kinds of pressings and executive aircraft.

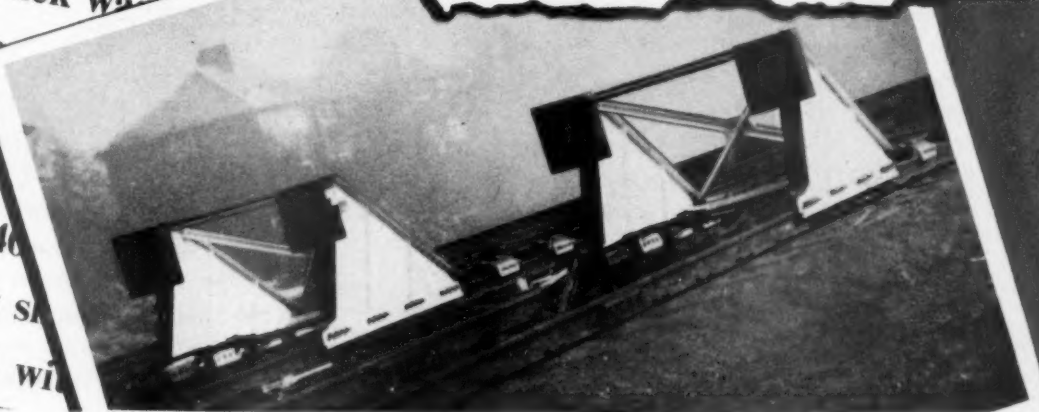
150 SECONDS — YOU CAN HAVE THE BEST OF BOTH WORLDS

TRUCKS CRASH BUFFER

CHAOS IN SIDINGS

BY A STAFF REPORTER

19 trucks being shunted at The
crashed into a buffer stop but
The leading truck was
containing four
overran the end
and finished up
hanging over a 40
down to the busy street
a street crowded with



The G. W. BUFFER STOP, already in use by British Railways, and in many industrial sidings, is designed to avoid the many accidents which endanger life and damage rolling stock when a train or wagons hit a fixed buffer stop at speeds which cannot be withstood without

causing derailment. G. W. BUFFER STOPS, manufactured under the RAWIE Patent, absorb the impact by friction, the whole unit sliding to a stop on the rail over a pre-determined distance. Any possibility of damage to train or buffer stop is thus eliminated.

GODWIN WARREN ENGINEERING LTD

EMERY ROAD, BRISLINGTON, BRISTOL 4. Telephone: BRISTOL 77072



MEMO TO

DATE

Bill

*We can't have
this sort of thing
happening here*

*Get in touch
with these
people*

2

NEW JACKSON UTILITY TAMPERS



MOST ECONOMICAL, HIGHLY EFFICIENT AND VERSATILE TAMPERS FOR A WIDE RANGE OF WORK

MODEL 260: Equipped with Diesel engine, large, extra-capacity generator and 4 Vibratory Tamping Units of the most powerful Jackson Track Maintainer type, this machine has maximum penetrating power in hard going, readily handles large ballast, badly fouled and cemented conditions. It's an excellent tamper for all work, whether it be smoothing, spot tamping or surfacing wherever maximum production tampers are not indicated. Very fast for new construction or any high lift work.

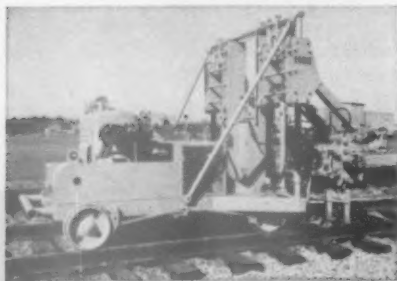
MODEL 104: Has gasoline engine and 4 TM1161 Vibratory Tamping Units. This is an excellent machine for work in all but the most difficult going . . . an ideal all-around tamper

for yard and branch line spot tamping, surfacing work, and emergency tamping. OK, too, for general use in small or soft ballasts. Excellent for new construction and high lift ballast insertions anywhere.

BOTH MODELS OPTIONALLY AVAILABLE WITH LIFTING JACKS

SIMPLIFIED FOR EASY, ECONOMICAL MAINTENANCE:

Both of these relatively low-priced models are simplified in design, power plant and controls for easy, economical operation and maintenance. Tops optionally available. You'll find the one best suited to your requirements an exceedingly good investment. Detailed information is yours for the asking.

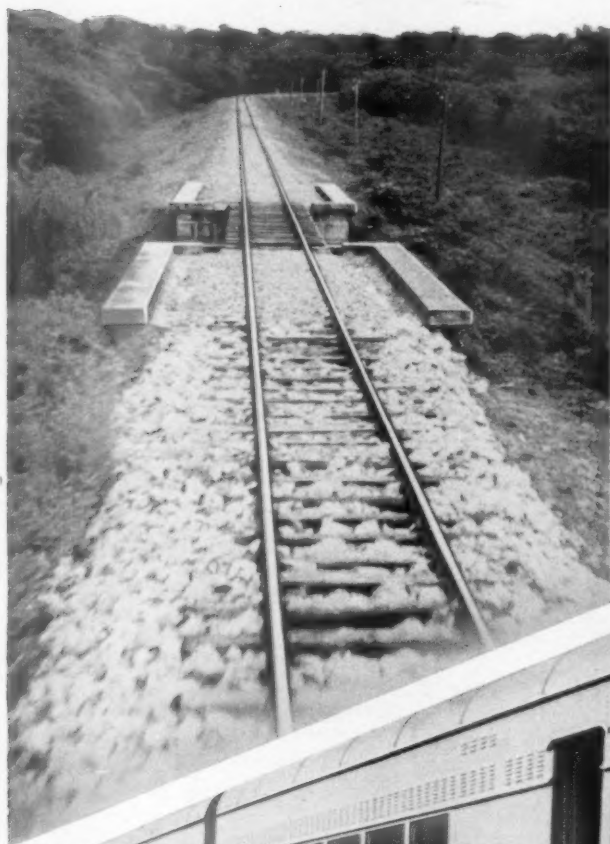


CROSS TAMPING: Jackson Tampers, like no others, are highly efficient in cross tamping because of their unique and powerful vibratory action which uniformly consolidates to maximum compaction a perfect tie bed of large proportions right under the rail base where it belongs.

Ad No. R1-SR

JACKSON VIBRATORS, INC.
LUDINGTON MICHIGAN, U.S.A.

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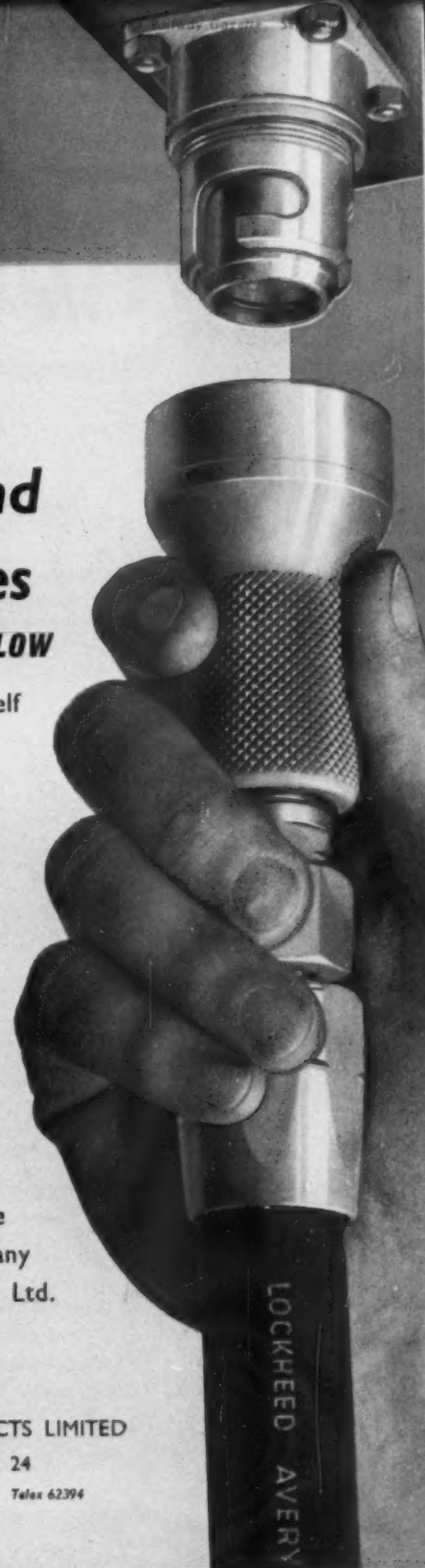
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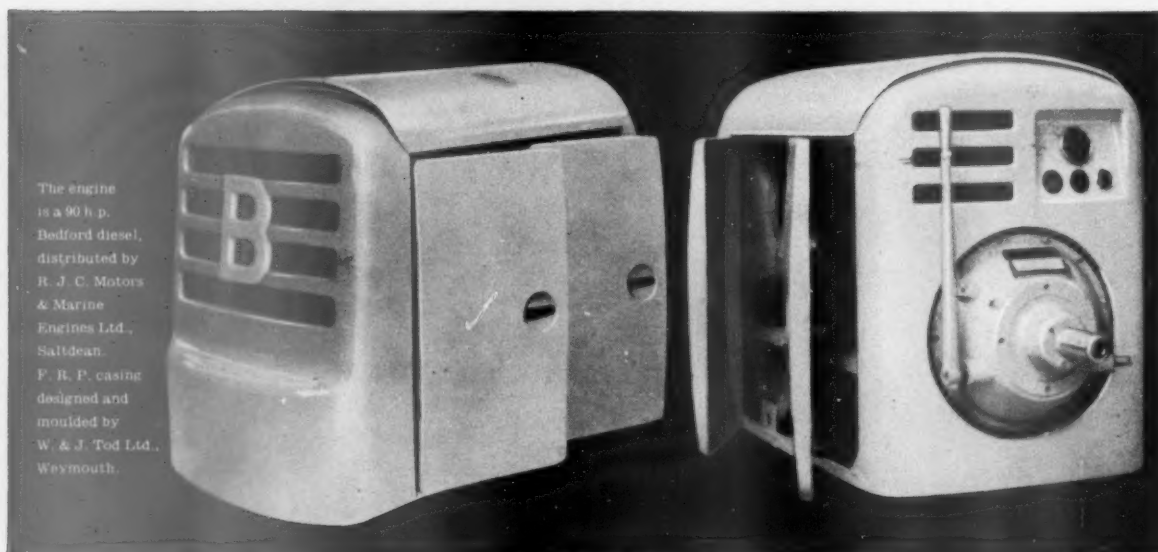
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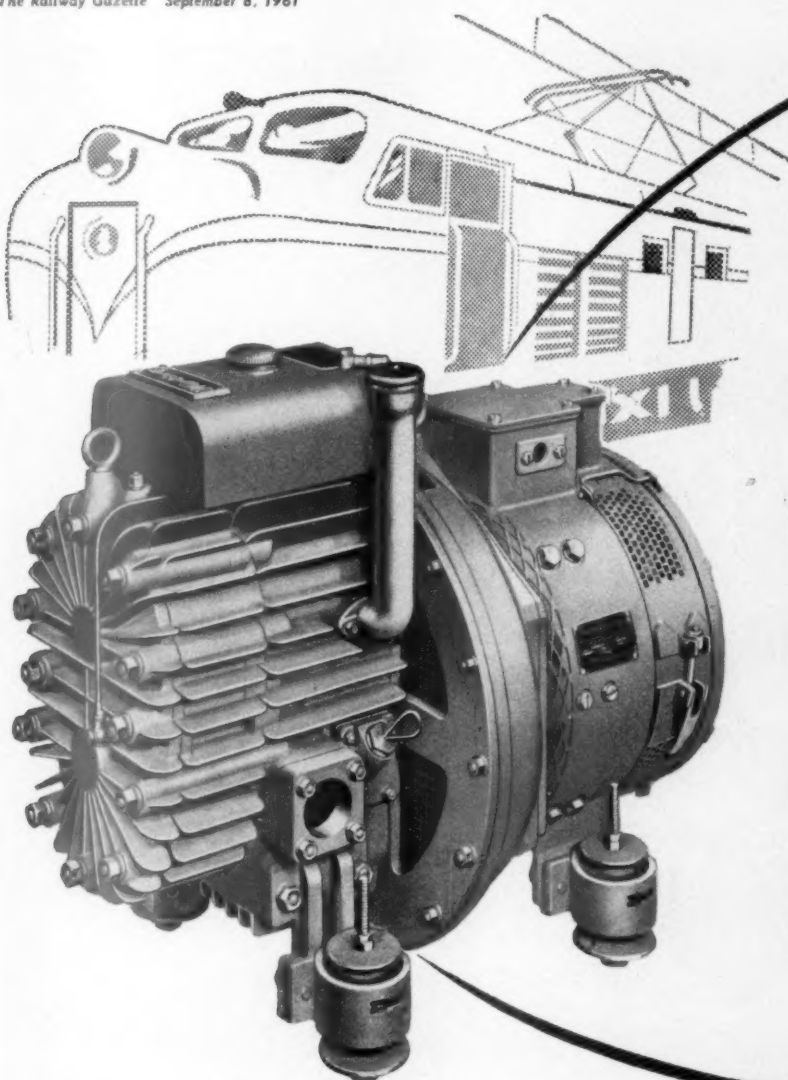
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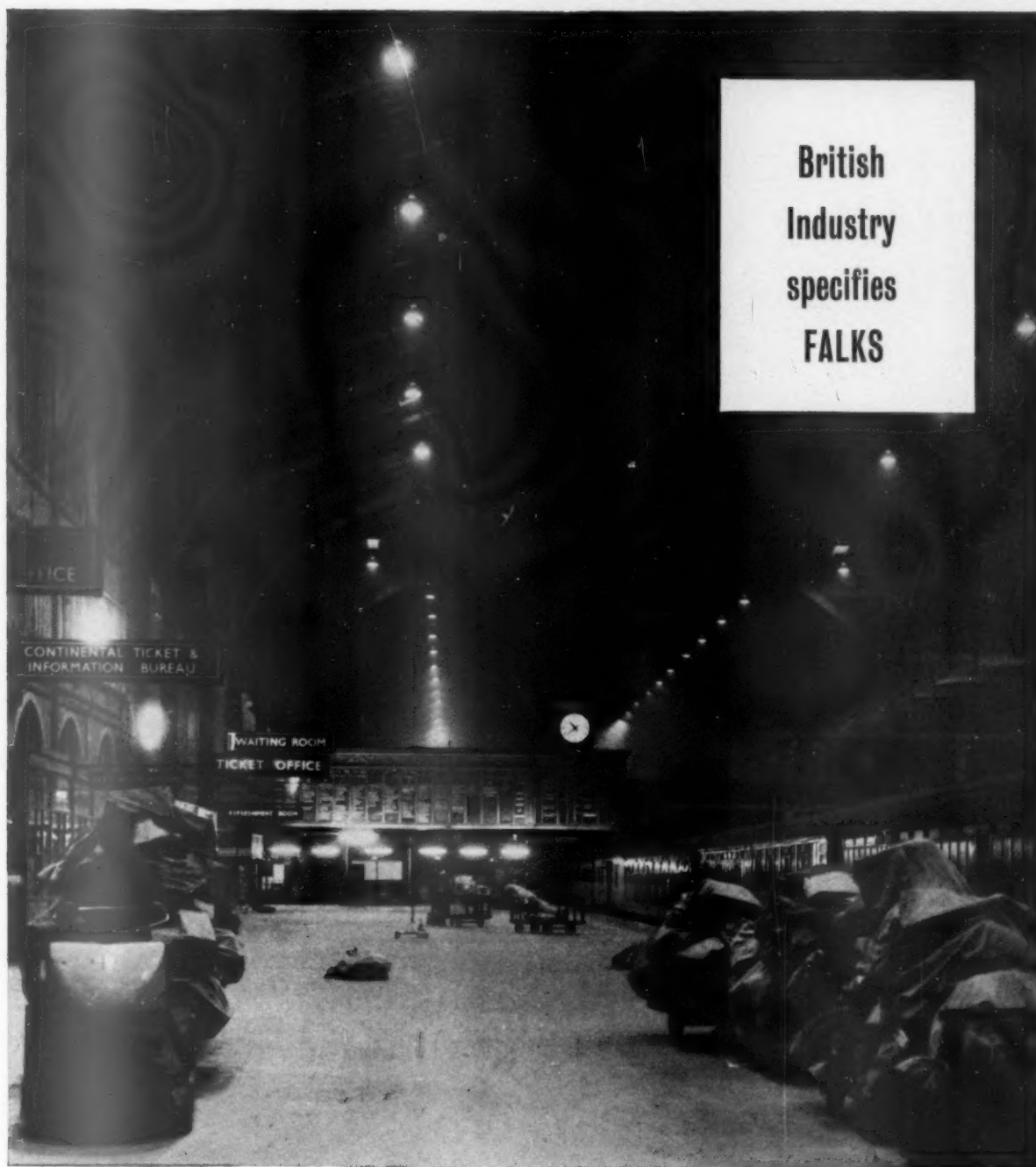
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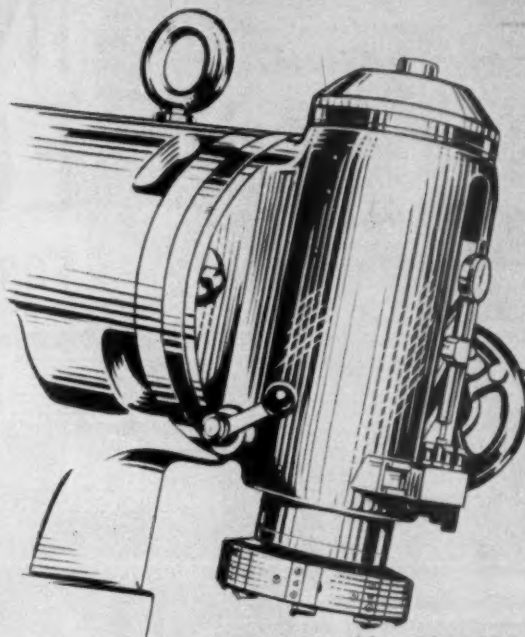
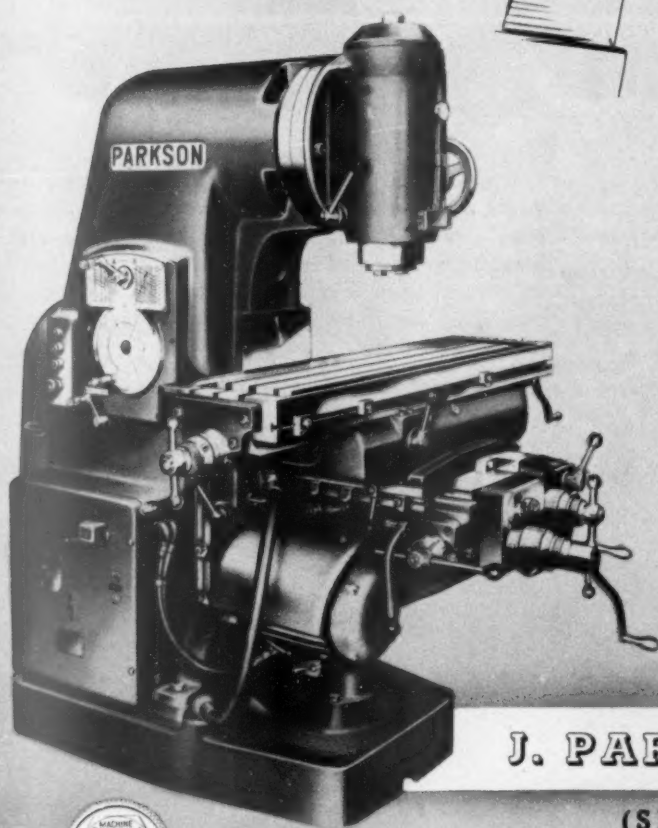
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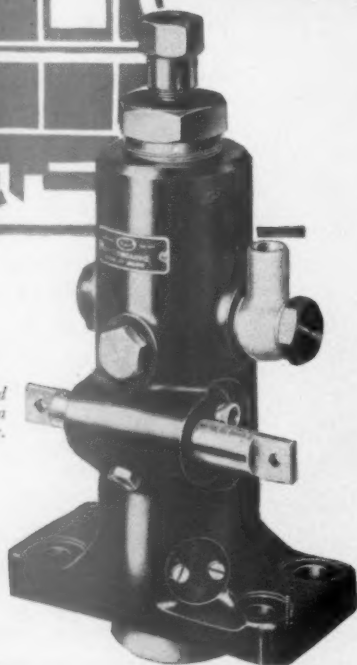
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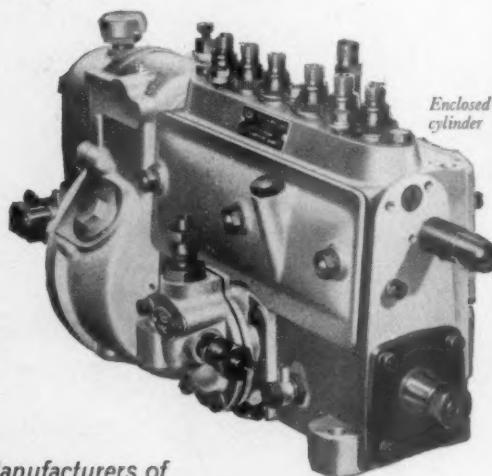


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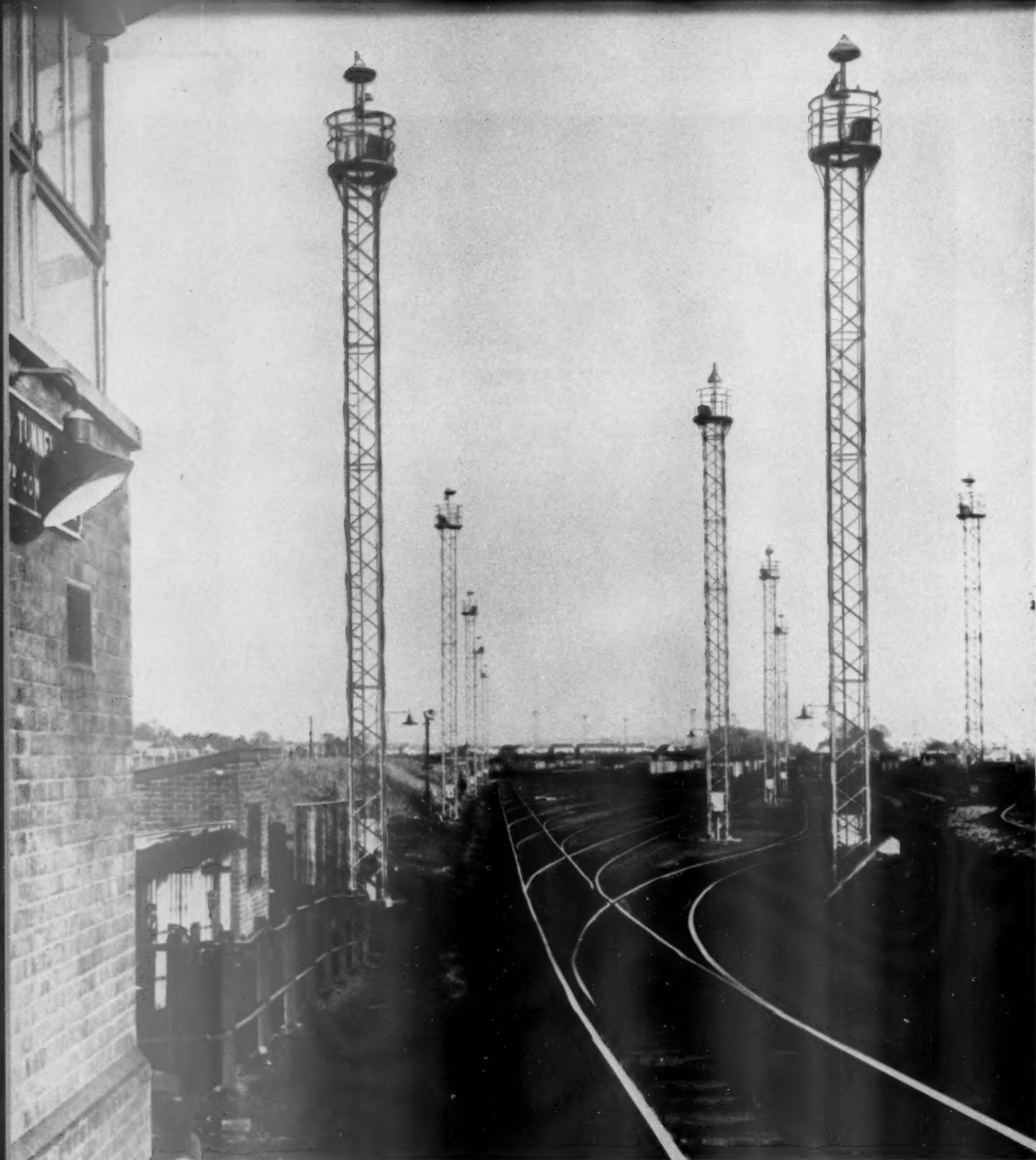
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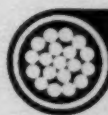
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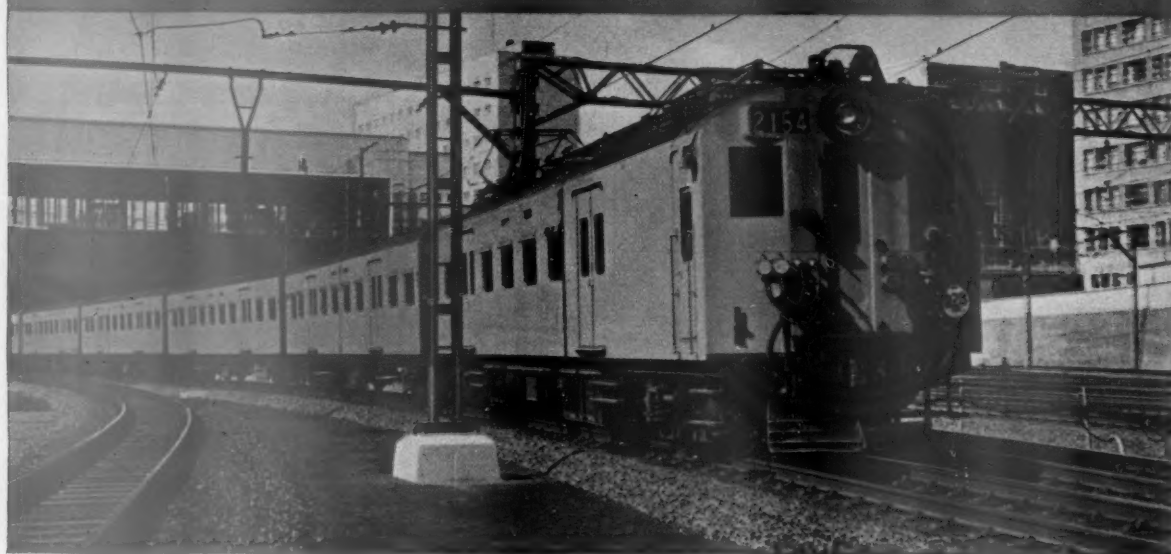


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A Journal of Management, Engineering and Operation

VOL 115

FRIDAY SEPTEMBER 8 1961

No. 10

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Railway co-operation with industry

IN THESE columns we have frequently stressed the importance from the national viewpoint of close co-operation between railways and manufacturers of railway equipment. In most countries this co-operation is very close, particularly in the case of the more highly industrialised nations which are desirous of expanding their export markets. In Great Britain the modernisation of British Railways has had the effect of bringing railways and manufacturers much closer together than was the case over a very long period. The calls which the railways have made on manufacturers in this country have been considerable but somewhat erratic. This latter element has been due more to governmental policy and constant changes in financial allocations than to any desire by British Railways to impede the progress of modernisation. The changes which have been made from time to time at the request of the Government, indeed, have been as frustrating to railway technical officers as to the railway manufacturers concerned.

The net effect of the alterations in the progress of railway demand and uncertainty as to its duration have presented manufacturers with a number of difficulties, and there would still seem a need for the laying down of some long-term policy which would be of benefit both to the railways as ensuring supplies and the manufacturers as a factor in long-term planning. Several countries overseas are developing indigenous sources of railway-equipment supply on a considerable scale, and an example of the support these manufacturers are receiving from their railways was given by a recent address by Mr. J. P. Hugo, the General Manager of the South African Railways. Speaking to the German Chamber of Industries in South Africa, Mr. Hugo said that the policy expressed in the phrase "Buy South African" for many years had been a cardinal principle of railway buying.

Value of railway orders

MR. HUGO stressed the importance of the South African Railways as a consumer. In 1938-39 railway purchases totalled R35-million, but 20 years later the amount was R222-million. During that period railway overall purchases advanced by 617 per cent and the value of local purchases rose by no less than 552 per cent. In the present unsettled economic conditions, which he believes to be temporary, major expansion projects are taking shape. A new railway line is to be built in the Northern Transvaal to provide transport for phosphates and iron ore. The Railway Administration will shortly complete electrification of the line between Beaufort West and Touws River and preliminary work has started on the electrification of the Germiston-Volkstrust section, which is the remaining non-electrified portion of the Natal main-line. Provision has also been made for the purchase of 130 large new electric locomotives, and goods wagons of various types are to be ordered. The Railway Administration has some 107,000 wagons, 6,000 coaches, 3,300 locomotives, and 5,300 road vehicles in service. The scrapping programme of obsolete stock is a never-ending process, and there has also to be considered the inevitable expansion to keep pace with a virile economy.

Basic considerations

AS A business organisation, the Railway Administration is bound by considerations of price, quality, delivery date and so on. Moreover, although as Mr. Hugo pointed out, wherever possible preference is given to goods of South African manufacture, a very considerable list of items cannot yet be manufactured in that country. He gave a list of some of these items which must be imported. These include machine tools and workshop plant, roller and ball-bearings, diesel locomotive spares, steel tyres for rolling stock, certain electrical equipment, proprietary spares for locomotives, such as ejectors, injectors and lubricators, plate glass, electric signalling and track-maintenance equipment, and certain types of earth-moving machines. He did not suggest that a stage had been reached when demand was large enough in all cases to make local production attractive, and he warned local manufacturers

that it would be unwise to found an industry solely in expectation of railway support. The railways could not be expected to subsidise any industry which would be the result of unqualified support.

U.K.R.A.S. sponsors railway visit

SPONSORED by the United Kingdom Railway Advisory Service (U.K.R.A.S.) at the request of the Brazilian Federal Railways, Mr. J. A. Broughall, Assistant Chief Electrical Engineer of the British Transport Commission, is to visit Brazil from September 11 to September 19 inclusive. He will attend a Brazilian Railways' conference on railway electrification at industrial frequency at which he will present a paper on British Railways' experience with this system of electric traction. The conference will be held in Rio de Janeiro. As well as attending and presenting his paper, Mr. Broughall will show films of railway subjects made by the B.T.C. film unit and by British industry. These will include "Railway electrification at industrial frequency," "Report on modernisation," "British locomotives," and "On the track of efficiency." The sound tracks of all the films have been translated into Portuguese. On his return journey Mr. Broughall will visit Trinidad. He is scheduled to arrive back in this country on October 1.

Designing for productivity

AN INTERNATIONAL survey of the management and function of design departments and drawing offices in the mechanical and electrical engineering industries is being carried out simultaneously for O.E.E.C. in nine countries: Austria, Belgium, France, West Germany, Italy, the Netherlands, Portugal, Sweden and the United Kingdom. At the request of the Board of Trade, the British report is being prepared by the British Institute of Management in conjunction with the British Productivity Council. The results will be forwarded to Paris, where they will be studied and analysed by a team of specialists including a B.I.M. representative, Mr. B. H. Dyson, formerly Director & General Manager for Overseas Production of Hoover Limited. An identical questionnaire is being sent out by each of the nine countries and will cover: position or relation of design and drawing office in the general organisation, personnel and material organisation of work, education, recruitment and training, accounting and allocation of costs, responsibilities of the design department with regard to the end-use of the product, production costs, and variety reduction in types and sizes. The final section deals with current design techniques, policy, and drawing office methods.

Availability over the years

WITH so much discussion nowadays on the subject of locomotive availability and the great mileages covered in a week, month, or year, normal traffic achievements of 70 years ago are often forgotten. It will be exactly that number of years on September 12 since the London & North Western Railway 2-4-0 locomotive No. 955 covered precisely 1 million miles in 9 years, 219 days. This engine, named *Charles Dickens*, ran every weekday from Manchester to Euston and back, a distance of 366 miles, except when stopped for repairs; on the above date it completed its 2,651st double trip. In addition to these regular workings, 92 other journeys were made, and just over 12,500 tons of coal in all were consumed. Still in service by February, 1899, the total mileage run by this little engine had reached 1,724,516. On the Manchester-London-Manchester turn, crews were changed in each direction at Rugby. In 1895 a sister engine, *Hardwicke*, covered the 141 miles over the difficult road from Crewe to Carlisle in an average speed of 67.2 m.p.h. There were 166 of these remarkable engines, each weighing only 32 tons 15 cwt. or 57 tons 15 cwt. with a 1,800-gal. tender.

Pre-apprenticeship in the North East

A PARTY of ten Grammar School boys, aged from 16 to 19, from the north east of England is to attend a study course, from September 4-8, which has been arranged by the Chief Mechanical & Electrical Engineer of the North Eastern Region of British Railways. The boys will see practical demonstrations and receive instruction through lectures and films on the construction of railway wagons, diesel railcars, and coaches operating on electrified lines. The course, which has been organised in conjunction with the Central Youth Employment Executive and the Public Schools Appointment Bureau, is intended to interest boys who are still at school in taking up a career on British Railways. The boys will have the opportunity of making up their minds with more certainty, and those who do decide to join British Railways should prove to be sound material for the pre-apprenticeship training school, to which editorial reference was made in our March 24 issue and which is scheduled for completion in 1962.

Western Region timetable

IN OUR issues of June 2 and August 25 we have commented editorially on the new passenger timetable which is being introduced on the Western Region of British Railways. Stage I, which embodies the services between London and the provinces, comes into operation on September 11 and incorporates a number of changes in timetable practice. The new timetable is a carefully planned endeavour to meet modern present-day requirements, and the factors which have led the Western Region to adopt it are explained in some detail in an article elsewhere in this issue. The author is Mr. L. W. Ibbotson, Assistant General Manager (Modernisation) of the Western Region, who was intimately associated with the planning and preparation of the new services. One feature of the timetable is the introduction of fixed-interval departures on a large scale, and another is the fact that it is designed to operate throughout the year, except at summer weekends. When it has become stabilised it is believed that the number of alterations should be relatively few and that the main structure can remain unchanged for many years.

Metropolitan Line abandons steam

FOR nearly forty years Metropolitan Line trains have been hauled by steam engines between Aylesbury and Rickmansworth. Electric locomotives have taken over for the rest of the journey to London. Tomorrow (Saturday) the last steam-hauled London Transport passenger trains will run on the line. In their place will be new and faster running "silver" electric trains operating a through service all day, including rush-hours, between Amersham and London, cutting out the engine change-over at Rickmansworth, and giving Amersham travellers a 7 to 10 min. quicker run to and from town. The only steam trains still using Metropolitan tracks will be operated by British Railways from Marylebone, and these are being replaced gradually by diesels. These changes are part of the final stages of the £9 million modernisation scheme due for completion next year. Amersham will be the terminus for the Metropolitan Line instead of Aylesbury, and British Railways will take over train services to Great Missenden, Wendover, Stoke Mandeville and Aylesbury. The changes involved are dealt with at greater length in an editorial article on page 268.

Competition in Canadian transport

A RECENT Commercial Letter of the Canadian Imperial Bank of Commerce points out that the development of new forms of freight transport has heightened competition in the industry, not only in Canada, but elsewhere. The letter states that it is evident that each form of transport is trying to find the markets

which it can serve more efficiently. Until a form of competitive co-existence is found, those carriers which are losing markets will have to make severe adjustments to operations. Since the war road transport has increased fourfold, airlines 12-fold, and water transport two-fold. Oil pipelines now account for a significant proportion of total freights. Railways have had difficulty maintaining their volume. This competition has focused attention on the fundamental problem inherent in the building of Canada's railways, namely, the interplay of straight business principles and such matters as national unity, development of natural resources, and defence policy. The letter states that, although the railways have modernised equipment and improved services, their pre-eminence as carriers has been steadily diminishing.

Nyasaland Railways Limited

GROSS receipts of Nyasaland Railways Limited and its subsidiary, the Central Africa Railway Co. Ltd., show that the working of the railway for 1960 yielded gross receipts of £1,171,639 compared with £1,104,740 for 1959 and that working expenses were £1,061,258 against £982,591; as a result the credit balance was £110,381 compared with £122,149 for the previous year. The Chairman, Mr. W. M. Codrington, in his statement to shareholders, points out that a slightly more stabilised political situation brought a greater improvement in traffic than had been thought possible. Tonnage of export traffic increased to 121,398 tons compared with 90,105 tons in 1959, an increase of 34.73 per cent. This was due largely to a record crop of groundnuts and a greatly improved maize crop. Total import traffic again showed a small decrease; 172,791 tons were carried compared with 172,946 tons in 1959. Although in recent years considerable sums have been spent on the improvement of the railway, there remains an urgent need for a fresh infusion of capital which will not be possible until the economic and political state of the country is more stable, and of this there is at present relatively little indication of early achievement.

Electric locomotives for South Africa

It is probable that the 135 Class "5E" electric locomotives manufactured by Associated Electrical Industries Limited, for the South African Railways will be the last completely British-made units for the Republic. South African Railways has called for tenders for a further 130 units worth about £9 million, but few are likely to be manufactured overseas. The decision to build electric locomotives in the Republic will not completely sever the relationship with Britain for one of the main contractors is likely to be the First Electric Co. Ltd., a subsidiary of A.E.I., which will make use of the technical knowledge of its parent. The same will be true of rolling-stock. For many years, the Metropolitan-Cammell Carriage & Wagon Co. Ltd., has supplied South Africa with carriages and wagons. In 1958 a South African concern, the Union Carriage & Wagon Co. (Pty.) Ltd., received an order for 332 officials coaches, valued at about £3 million, followed in 1959 with an order for 322 main-line coaches valued at £6,500,000. Last year the company received a contract for 449 suburban coaches valued at nearly £10 million. Again, the association between the British undertaking and the railways will remain, for Metropolitan-Cammell holds a large interest in the new company.

Scottish Region winter timetable

THE most interesting feature of the winter train service of the Scottish Region is that the fast diesel service started experimentally a year ago twice daily in each direction between Aberdeen, Elgin, and Inverness has found favour to such an extent as to justify doubling the number of trains, and, moreover, not during the summer but during the winter. From September 11, instead of the present 8.45 a.m. and 5.30 p.m.

from Aberdeen, the diesel trains will leave at 7.50 and 11.45 a.m., 1.50 and 6 p.m., all taking 2½ hr. and calling at Keith Junction, Elgin, Forres, and Nairn, and the first and third at Huntly in addition. Eastbound, departures will be at 8.30 and 10.45 a.m. and 2.30 and 5.30 p.m., instead of the present 8.30 and 5.15 p.m., the second and fourth making the additional Huntly stop. The same two-set trains, provided with miniature buffet facilities, will cover all eight workings.

The entire service over the former Great North of Scotland lines has been recast, with additional trains and, with the help of diesel traction, some acceleration also. The previous long-distance trains, with altered starting times, will continue to provide the service to and from intermediate stations, and also over the Craigellachie and the Coast lines between Cairnie Junction and Elgin.

The Winter service between Inverness, Wick, and Thurso comes down to the customary two trains in each direction daily, with one additional to and from Helmsdale, but on the accelerated summer timings; as compared with last winter, the 6.40 a.m. from Inverness will reach Wick 32 min. earlier, at 11.37 a.m., and the 11.25 (previously 11.5) a.m. at 4.10 p.m., 17 min. earlier, a total gain in the latter case of 37 min. Southbound, the 9 a.m. from both Wick and Thurso (9.20 a.m. last winter) will be into Inverness at 1.55 p.m., 50 min. earlier, and the 5 p.m. (previously 3.35 p.m.) at 9.56 p.m., which is 54 min. later.

The restaurant car on the 6.40 a.m. from Inverness is to be transferred to the 9 a.m. from Wick at Kinbrace (10.20/10.25 a.m.) instead of at Helmsdale as hitherto.

By contrast with these improvements, it seems surprising to find no acceleration contemplated for the next nine months as the result of the extensive introduction of diesel-locomotive power between Perth and Inverness. Even allowing for the summit levels to be surmounted, times of 3 hr. 35 min. to 4 hr. by the principal trains over this route (32.9 to 29.5 m.p.h.) seem capable of substantial cuts in these days of railway modernisation.

Certain changes are to take place on the West Coast main line between Carlisle and Glasgow. As usual, the Down "Royal Scot" will resume its passenger stop at Carlisle, and reach Glasgow Central at 4.15 p.m., 18 min. earlier than last winter but 10 min. later than during the summer. The Down "Midday Scot," reverting to its 12.50 p.m. departure from London Euston, will be into Glasgow at 8.30 p.m., 5 min. earlier than during the summer but 15 min. later than last winter (due to additional stops in England and increased loading). The Down "Caledonian" will be due in Glasgow at 10.55 p.m., as during the summer, but with a London departure 10 min. earlier, at 3.45 p.m.

In the Up direction the "Royal Scot" will be 5 min. later than its present time into Euston, at 5.10 p.m.; the 8.30 a.m. "Caledonian" and 1.30 p.m. "Midday Scot" also will both be slowed by 5 min. to Euston, arriving at 3.40 p.m. and 9 p.m. respectively. The 11.10 a.m. (now 11 a.m.) from Birmingham to Glasgow will be accelerated by 10 min. and arrive in Glasgow at 5.55 p.m. as last winter. The all-sleeping-car train from Euston to Glasgow will run 10 min. earlier throughout, leaving London at 9.35 p.m. and arriving at 6.30 a.m.

On the East Coast route most of the trains between Edinburgh and Kings Cross will be 9-10 min. faster than last winter, but this acceleration took place in the present summer service, due to the reduction in recovery times over the Great Northern line. The one major acceleration of this summer, that of the "Deltic"-hailed Down "Aberdonian" by 52 min. from Kings Cross to Aberdeen, remains in effect, save for a slowing down by 8 min.; the Aberdeen arrival is now timed to be at 6.35 a.m.

A steady increase continues to take place in the provision of buffet and miniature-buffet facilities on Scottish trains. This winter every one of the hourly expresses from Glasgow Buchanan Street to Dundee and Aberdeen from 7.15 a.m. to 3.15 p.m., with the 5.0 and 5.30 p.m., the 10 a.m. and

4.25 p.m. to Inverness and the 6 p.m. to Oban, will be so provided or with full restaurant car service. The same applies to all the corresponding Up trains except the 3.30 p.m. "Postal" from Aberdeen. Also, of course, there are all the frequent Inter-City diesel trains between Edinburgh and Glasgow; the only service from which these facilities have been withdrawn, due to lack of patronage, is that between Glasgow St. Enoch, Ayr, and Stranraer.

Metropolitan Line changes

EXTENSIVE changes to London Transport's Metropolitan Line services will operate from Monday, September 11, when Amersham, instead of Aylesbury, will become the terminus for Metropolitan Line trains, and stations beyond will be served only by trains of the London Midland Region of British Railways, which is taking over responsibility for this section of the line from this date. This is an important interim stage in the modernisation programme for the Metropolitan Line.

The timetable for the line is being completely revised and, although the present volume of peak-hour services at most stations will not be altered, the timings and routings of some trains will be changed. There will also be alterations to off-peak services, and passengers are being asked to consult poster timetables at local stations for details. This new timetable is only temporary, allowing the last stages of the modernisation scheme to go forward, and is not the final pattern of services. This cannot be introduced until the four-tracking scheme is completed next year.

New trains of the A.60 stock, now coming into service on the Metropolitan Line, will operate through services between London and Amersham all day and will also run to Chesham in peak hours, replacing the present compartment-type trains hauled from London by electric locomotives as far as Rickmansworth and by steam locomotives onward. The present locomotive change at Rickmansworth will be eliminated and the faster running of the new trains north of Rickmansworth will reduce journey-times for Amersham passengers by 7 to 10 min. in each direction. The named electric locomotives which have been a familiar sight for so many years are to be withdrawn from passenger service, but a few will be retained for miscellaneous non-passenger duties.

All but one or two Metropolitan Line trains to and from Amersham will run non-stop between Moor Park and Harrow, and between Harrow and Finchley Road. As now, the Harrow stop will be omitted in peak periods. Passengers for local trains must change at Moor Park or Harrow.

The timetable will give Amersham, Chesham, Chalfont & Latimer, Chorley Wood, and Rickmansworth stations a regular-interval fast service every half-hour to and from Baker Street for most of the day outside peak hours. Trains will leave Baker Street at the hour and half-hour, and Amersham at 2 and 32 min. past the hour. This regular interval will apply generally throughout offpeak periods, except on a few occasions when a British Railways Marylebone train, running in very similar timings, takes the place of a Metropolitan train. This arrangement will continue until the modernisation scheme is completed, when the Metropolitan Line service—then considerably increased—will go over completely to regular "clock-face" intervals all day, including peaks.

British Railways trains between Marylebone and Aylesbury will continue to operate as now, although some will call additionally at Harrow, and none will call at North Harrow, Pinner, or Northwood Hills. All these London Midland Regions train will have first and second class accommodation.

To replace the present Metropolitan proportion of the service north of Amersham, British Railways will introduce a supplementary diesel shuttle service daily between Amersham (where it will connect with Metropolitan Line trains), Great Missenden, Wendover, Stoke Mandeville, and Aylesbury. A similar service has been provided on Sundays since September 18, 1960, when

the through Metropolitan Sunday service was curtailed at Amersham.

There will be a Metropolitan Line train every 15 min. to Croxley and Watford in off-peak periods, giving these stations a regular-interval off-peak service of the same frequency as is now provided locally to stations between Harrow and Moor Park.

The bringing into use of a 2½-mile section of new double track from north of Harrow to just north of Northwood Hills, making four tracks between these points, makes it possible for all British Railways steam and diesel trains and the fast Metropolitan Line trains to Amersham and Chesham to use the new (fast) tracks, leaving the present tracks for local Metropolitan Line trains. This will mean that the Pinner group of stations—North Harrow, Pinner, and Northwood Hills—will be served only by the Metropolitan Line stopping trains, as platforms are not being provided on the fast tracks at these stations. To compensate for the occasional British Railways trains which used to serve one or other of these stations, some of the Metropolitan Line trains—two or three an hour—which now terminate at Harrow, will be extended to Northwood Hills, where a temporary reversing siding has been constructed. Passengers from these stations wishing to travel to and from Marylebone will be able to change to British Railways trains at Harrow.

The additional pair of tracks will be brought into use on the afternoon of Sunday, September 10, for use by British Railways trains only, but all point and signal work will be ready in time for the revised service on Monday, September 11.

The remaining 3½ miles of four-tracking, from Northwood Hills to Watford South Junction, will not be brought into use until the new stations at Northwood and Moor Park, new or rebuilt bridges, and track layout alterations at the junction with the Watford branch are completed next year.

Indian second five-year plan

ON March 31, 1961, the Indian Second Five-year Plan period came to an end. The following is a brief review of its activities. The Second Plan was designed to consolidate and modernise the system generally and overtake arrears of maintenance and replacement. It also had to cope with remarkable increases in both goods and passenger traffic.

The principal measures taken to meet all these circumstances were the placing in traffic of some 2,000 locomotives, 8,500 coaches and nearly 100,000 wagons. Also on the civil engineering side, the completion of about 800 miles of new construction, including the 187-mile north-south metre-gauge Khandwa-Hingoli link, 275 miles to serve the iron and coal industries. Moreover, the building of the great Mokameh Gauges, Brahmaputra and Gandak bridges are or will be important links in the chain of progress.

On the "open-line" side of the picture, it is noteworthy that 800 miles of line were converted from single to double track, and many more miles were in hand in March. Important developments in signalling and bridge-strengthening were also undertaken.

In the field of new developments there was the purchase of 100 main-line 5-ft. 6-in. diesel and many electric locomotives and of multiple-unit stock. These new types of locomotive are making possible the movement of the great volumes of ore, coal and limestone for the new steel plants at Durgapur, Rourkela, and Bhilai, which with extensions of the older plants are the keystones of the development of heavy industry.

The cost of the Second Plan is stated to be in the neighbourhood of £1,500 million, but it has made possible the carriage of 1,624 million passengers and 54,000 million ton-miles of goods traffic, the latter figure an increase of about 50 per cent over the volume moved in 1950-51. A marked feature of the period was the increase in indigenous production, especially locomotives at Chittaranjan, coaches at the Integral Coach Factory and wagons by industry.

Estoril timetable and fare revision

REFERENCE has been made in earlier notes and articles in *The Railway Gazette* to the progress in the modernisation of the Estoril Railway which operates an electrified train-service between Cais do Sodré (Lisbon) and Cascais, in Portugal.

A recent development of some importance has been the complete recasting of the timetable, with a considerable increase in the number of trains and, in some cases, a reduction in overall schedules. The new service, which came in force on September 1 (incidentally, the first major alteration for over five years), provides for a total of 236 trains daily between Lisbon and Cascais (119 Down and 117 Up). Hitherto, the through service on working-days totalled 123 trains, with an additional 16 running to and from the National Stadium via Cruz Quebrada.

A great advantage from both operating and passenger-loading standpoints will be the terminating and reversal of several trains at Algés and Oeiras, consequent on alterations to the layout at these stations. Modern three-aspect colour-light signalling, with track-circuits and axle-counting, has been another factor in the matter of improved line capacity.

The number of "rápidos" from Lisbon to Cascais and return, covering the 16.3 miles in 28 min. with stops at São João, Estoril, and Monte Estoril, has been increased from three to six, and semi-fasts running non-stop between Oeiras and Alcantara and with an overall timing of 34 min., are more numerous than the original "skip-stop" trains which operated in the rush-hours on the same schedule. Furthermore, it has been found possible not only to reduce the total circulation of "omnibus" trains, but to cut the schedule of the survivors from 48 to 42 min. Maximum permitted speed still remains at 90 km.p.h. (56 m.p.h.), but the rolling-stock constructed or re-built by SOREFAME has better accelerative and decelerative powers than the older vehicles it has replaced.

The revised timetable trains which run (a) from Monday to Friday only and (b) additionally on Saturdays are clearly marked, so that there has been no need to print the Sundays and Feast-days service separately. Nevertheless, a footnote

states that "Specials" will be run on such occasions, both on the main line and to the Stadium for sports enthusiasts.

September 1 was also noteworthy as the date from which all trains on the Estoril Railway began to cater for two classes only, in conformity with the system recommended for adoption throughout Europe. A major consequence has been a revision of ordinary fares, whereby first and second class passengers now pay the virtual equivalent of the original second and third class fares respectively. By way of comparison with costs in Britain, the price of a single first class ticket between Lisbon and Cascais is 1s. 7½d., and that of a second class 1s. 1½d.; return fares in all cases are exactly double. One modification has been the introduction of a minimum fare of 6d. (second class) and of 7½d. (first class), which may hit the very short-distance passenger, although in compensation it covers a journey up to 9 km. (about 5½ miles).

The basic principle of season-ticket charges has been completely overhauled. Every effort has been made to favour the long-distance "commuter" who has no alternative public transport in this area. To exemplify the new system, a 12-month first class season-ticket between Lisbon & Cascais, or "Zone 5," will cost £16 12s. 6d.; if the traveller prefers to take out his "season" monthly, he pays £2 17s. 6d. for the first month, £1 18s. 9d. for the next 10 months, and nothing at all in the 12th month, the sum of his outgoings thus amounting to £17 5s., or an additional 12s. 6d. To show how he benefits in the relative sense, a commuter in "Zone 1" (applicable up to a distance of roughly 4½ miles) would be charged £8 5s. for the full 12 months, with monthly payments, should he opt for this method, likewise approximately 50 per cent of those made by his long-distance colleague. Although "seasons" in general cost very slightly more than hitherto, the limit set to the number of journeys which each individual holder could make has now been abolished.

An innovation in this field has been a weekly season ticket (second class only), available from Sunday to the following Saturday, and entitling the holder to 14 journeys in this period; typical prices are 2s. 6d. up to 6 km. (3½ miles), 6s. 3d. up to 15 km. (9½ miles) and 11s. 3d. for the full distance Lisbon-Cascais.

LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

THE U.S.A. RAILWAY POSITION

September 2

SIR, The A.A.R. statement of revenues and expenses for the first six months of this year, supplements the particulars given in your August 25 article. The half-yearly results are slightly better than those at May 31. Operating revenues of \$4,418.6 million were \$471 million, or 9.6 per cent, less than in 1960, freight receipts being down 10 per cent and passenger receipts 5 per cent. Parcels revenue also dropped by \$14 million, or 26 per cent. Operating expenses were cut by nearly \$244 million, or 6 per cent, but operating ratio rose from 78.5 last year to 81.4. Taxes were 11 per cent lower, at \$60.7 million—still a burdensome load—while equipment rents were larger by close on \$20 million, or 13 per cent.

The outcome was that the railways had a net railway operating income (earnings before charges) of almost \$146 million against \$284 million in 1960, a decrease of about 56 per cent. The number of companies in deficit was 25, compared with 18 last year. The New York Central was fully \$18 million on the wrong side of the account. With a 17.5 drop in freight revenue and a 13 per cent fall in passenger receipts, it reduced operating expenses by little more than 9 per cent and worked at a 90 per cent ratio. The Pennsylvania lost 18.5 per cent of freight revenue, but only 1.7 of passenger takings, cut expenses by 11 per

cent and held its operating ratio at 85 per cent, finishing the half-year with a deficit of \$12.4 million. Other well-known companies like the Baltimore & Ohio, New Haven, Erie-Lachawanna, and Lehigh Valley are in as bad a plight. The recovery of these railways in the Eastern District depends on their ability to operate at a ratio of not more than 83 per cent. In the past half-year the Norfolk & Western, working at a ratio just under 60 per cent, earned \$28 million, \$2 million or so more than the Southern Pacific system, working more than four times the N. & W. mileage at a ratio of 77.3 per cent, earned.

Yours faithfully,

YOUR CORRESPONDENT

Westminster, S.W.1

RUBBER SUSPENSION

August 29

SIR, In your issue of July 28, Mr. Sheppard states that no Metalastik main-line bogie has ever shown a tendency to hunt, even after nearly 70,000 miles, though it is clear from a previous letter (see your June 2 issue) that only two such bogies are in service.

The odds are that the same statement could also be made after a similar test on an equally small number of conventional bogies, for it is a surprising fact—as yet largely unexplained—that most individual bogies do not hunt even when they have

run well over 70,000 miles. Due mainly to friction in the bolster slides they would doubtless ride roughly, but that is quite different from hunting.

It also appears that the rubber suspension is not as soft as the 7½-in. static deflection and 30-in. equivalent swing-link length would indicate, for the bogies are only claimed to "perform at least as well" as the British Railways standard type, whereas with the same figures, the best possible version of the conventional bogie would give an immensely superior ride.

Yours faithfully,
YOUR CONTRIBUTOR

London, S.W.1

WESTERN REGION TIMETABLE

September 3

SIR,—A much-publicised feature of the new Western Region timetable is the vastly improved express service given to intermediate junctions such as Didcot and Westbury. But there is very little originating traffic at these stations, and calls by expresses can only be justified by feeding into and out of local connecting services. Unfortunately, many local trains have been left unaltered and naturally fail to connect with the new fast services.

Take Didcot, where the main interchange flow, apart from Paddington-Reading-Oxford, is Oxford-Swindon-Bristol-the West-South Wales-Gloucester. In the morning peak there is a particularly infuriating set of missed connections due to the interaction of retimed expresses and unchanged locals. The 7.45 a.m. Paddington to Weston calls at Didcot 8.48/8.49 a.m.: these public times have, I suspect, been "juggled" to avoid showing a connection from the 8.29 a.m. Oxford, which arrives at Didcot at 8.49 a.m. Consequently, Oxford passengers for this key service to points west must start their journey at 7.38 (SO) and 8.2 a.m. (SX) and wait at Didcot for 49 and 25 min. respectively. Nor is this all. On the Up line, the 6.30 a.m. Weston to Paddington calls at Didcot 8.37/8.40 a.m., thence non-stop to Paddington, entailing a change at Didcot for passengers to Reading. Now in the eight minutes before their arrival at Didcot, two trains have left for Reading at 8.29 and 8.33 a.m., and a further non-stop to Paddington will leave at 8.51, but they must wait until 9.20 a.m.—an interval of 43 min. before they can continue on to Reading.

This unsatisfactory situation could be set to rights by a few simple adjustments without outraging operation requirements. First, the 7.45 a.m. Paddington should revert to more "natural" timings, with a Didcot stop at, say, 8.49/8.52, which would still give an ample 29 min. for its Didcot-Swindon run. Second, the 8.29 a.m. Oxford, which now enjoys an over-generous allowance for the combining of its Leamington and Moreton portions, should leave Oxford at 8.26, reaching Didcot at 8.46 and so connecting into the Down express. Third, the 8.29 a.m. Oxford should continue on from Didcot proportionately earlier, using the extra time available to make an additional call at Reading. This would provide not only a quick connection to Reading for traffic out of the 6.30 a.m. Weston, but also a much-needed through service between Oxford and Reading, bridging the gap between the 8.2 and 9.25 a.m. trains.

There is an even worse case of missed connections in the evening. The new 6.45 p.m. Paddington to Weston calls at Didcot 7.37/7.40 p.m. The 7.18 p.m. Oxford to Didcot local is unchanged—except that several minutes have been inserted in its schedule over the last two miles into Didcot to prevent a connection with the Weston train: because of this, passengers from Oxford must leave at 5.52 p.m. and spend no less than 89 min. contemplating the delights of Didcot Station. This is a fantastic situation when advance publicity for the service implied that one of the objects of the new timetable was to make cross-country journeys between important centres more speedy: and it is pertinent to note that the Bristol-bound

traveller, starting from Oxford at 5.52 p.m., spends an overall 192 min. over the 75-mile journey; but nearly half the time is spent in waiting for a connection. It could not be argued that better alternative services exist before or after this time. By the 5.5 p.m. from Oxford the journey takes 221 min., including two changes, and is not available on Saturdays, and by the 7.47 Oxford, it takes 149, including a wait of 45 min. at Didcot.

Here the remedy is obvious, for the 7.18 p.m. Oxford (a through diesel working from Wolverhampton) lingers at Oxford for 13 min. (seven on Saturdays). A start about four min. earlier from Oxford and normal running times thence to Didcot would enable it to connect comfortably into the 6.45 p.m. Paddington.

Connectional anomalies can never be completely avoided, but when the railways are fighting for their lives against the private car, the examples of missed connections given above are lethal to the railways' cause because of their irritant effect on would-be travellers. This is particularly tragic because they could be rectified so easily without apparent operational difficulty. The Western Region's interval timetable deserves success, but it will not succeed until more attention has been paid to the inter-relation of main-line and local services at focal junctions.

Yours faithfully,
N. J. SHURROCK

4, Oxford Road,
Abingdon, Berkshire

RAILWAYS INTO ROADS

August 30

SIR,—At one point in this correspondence it seemed agreed, more or less, that the capacity of a railway after it had been converted into a road could be expressed as x motor vehicles per hr. each carrying y passengers, compared with a pre-conversion capacity of y railway trains per hr. each carrying x passengers. "What, then, is the object of conversion?" enquired a correspondent.

He implied that xy passengers would be using the route in the peak hour, and that so long as they were adequately catered for nothing else mattered: change could not be justified.

To compare peak rail capacity with peak road capacity in this way is perfectly fair. But the comparison is of very limited application, for it is relevant only when and where full use is made of peak capacity, which requires a load (the pro-rail element, say) of 30,000 passengers per hr. per rail-track or road-lane. Railway passengers seldom or never materialise in such numbers. Nor, after conversion, will bus passengers materialise in those numbers. But the difference will be that, whereas the spare capacity of a railway goes unused and is wasted, the spare capacity of a converted railway will be used.

For instance, if British Railways' dozen main routes serving Central London were converted into motor roads, on each of which two lanes (one Up, one Down) were reserved for buses in the peak hour, the resulting bus services would be able (the pro-rail element admit) to deal with an hour's inflow or outflow of 360,000 passengers, compared with the present peak-hour load on these entire routes of 240,000 B.R. passengers. The dozen routes comprise at present a minimum of 70 rail-tracks, which would yield more than 70 road-lanes. Accordingly, after conversion, they could comprise 24 bus lanes and more than 46 other lanes available for private and commercial motor vehicles. Thus, at the present time, even when they are at their busiest, the B.R. lines serving Central London constitute routes with more than two-thirds of their capacity wasted!

In fine, one object of railway conversion is to do away with the waste of route capacity that occurs whenever and wherever a route is used as a railway.

Yours faithfully,

T. I. LLOYD,
Brigadier

24, Grove Road,
Merrrow, Surrey

The Scrap Heap

L.T. steam loco. of 1899 scrapped

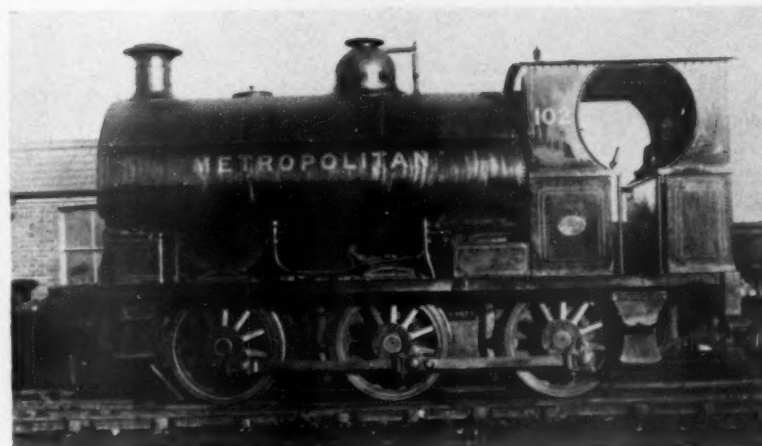
The second London Transport 0-6-0 Peckett saddle tank locomotive, the 62-year-old No. L.54 (formerly Metropolitan Railway No. 102) has been withdrawn for scrapping. In its latter days it has been confined to shunting duties at Lillie Bridge Depot. No replacement is being sought, and the fleet of steam locomotives will be reduced from 13 to 12. The stock was increased to 13 to handle extra engineers' trains and other miscellaneous requirements connected with work on the Metropolitan Line. Now that electrification is complete and four-tracking well in hand, the steam locomotive total will be reduced to 11. The sister locomotive, No. L.53 (formerly No. 101), was withdrawn last year after 63 years of railway service.

The fate of old carriages

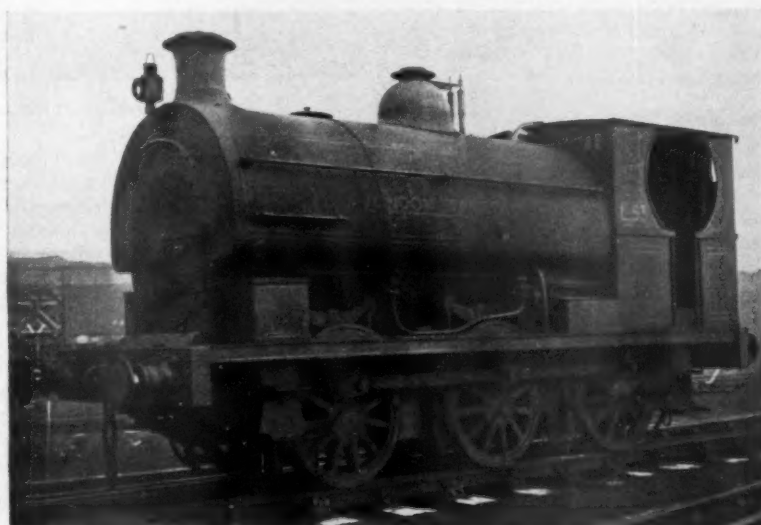
Homes have been found for five of the six oldest London Transport passenger vehicles, the coaches of the former Chesham branch steam shuttle trains. These dated from 1898/1900, and were retired from passenger service on September 12, 1960, when electric trains took over the branch line service. They formed two three-coach push-and-pull trains. Four of the coaches have been taken over by the Bluebell Railway to run on its 4½-mile line in Sussex. Three of these (Nos. 512, 515, and 518) have been purchased outright, without reservations, by the Bluebell Railway, and the fourth (No. 516) has been purchased subject to the proviso that it shall not be disposed of without prior reference to the British Transport Commission. The fifth coach (No. 519) is to be restored for the museum of British Transport at Clapham, and probably parts of No. 513 may be used in the restoration. It was built by the Metropolitan Railway in 1900.

Pathfinder

On August 3 Mr. W. H. Moore, General Manager, Western Lines, Southern Railway System, U.S.A., presented diesel locomotive 6100 to the National Museum of Transport, St. Louis. The locomotive is one 1,350 h.p. "A" unit of the 5,400 h.p. General Motors freight demonstrator that in 1940 toured 83,764 miles in 35 States, in competition with steam-powered locomotives. After the success of this locomotive, railway systems in the U.S.A. progressively converted to diesel-electric power. Locomotive 6100 was renovated after its historic trip and sold to the Southern Railway, where it served for two decades,



Metropolitan Railway Peckett 0-6-0ST No. 102 (later L.54) in Metropolitan livery



Metropolitan Peckett 0-6-0ST No. L.53 (originally 101) in London Transport livery

during which the Southern Railway became the first major system in the U.S.A. to be completely dieselised.

Cheap day return ?

Police are investigating reports that at York races recently touts offered railway tickets for journeys between Leeds and Kings Cross, and Newcastle to Kings Cross, at 5s. each. The correct fares are 39s. and 51s. respectively.

Derailed

A reporter of a leading Melbourne newspaper, intrepid, curious and female, came across the London & North-Eastern Railway in the Melbourne

telephone book recently and rang to ask what on earth it was doing there. The telephone was answered by a shipping company which was surprised to learn it was also a train service which had been nationalised 15 years ago. It did not know its *alter ego* was still in the book —From "The Age."

Fate worse than death ?

A rating escaped from a naval escort at Torre Station, Torquay, on August 29 by jumping from the platform in front of an oncoming train. He ran across the line and the train stopped the three-man escort from following. The rating had been remanded as an absentee.

OVERSEAS RAILWAY AFFAIRS

FROM OUR CORRESPONDENTS

U.S.A.

Road trucks for on-track troubles

To deal with freight-car derailments and minor mechanical troubles out on the line, the Baltimore & Ohio Railroad has introduced a number of 3½-ton road trucks equipped with re-railers, 35- and 50-ton jacks, slings, chains, a retractable 2-ton hoist for handling details, and oxygen and acetylene burning and cutting equipment. Each truck carries two pairs of standard freight-car wheel-sets. Heavy-duty mud and snow tyres are fitted so that these trouble trucks are more or less independent of weather or site conditions. A truck and three or four men are driven immediately to the trouble point when a report is received and can often clear the trouble in a couple of hours or so without the complication and time-delay in calling out a breakdown train.



Road truck for on-track breakdowns

Terse annual report

Accompanying the 1960 annual accounts of the 214-mile Green Bay & Western, a Class "I" railroad carrying over 2 million tons of freight a year. The President, Mr. H. E. McGee, stated: "Business is down. The cost of doing business is up. The continued upward trend of taxes and wages, and the higher costs of materials and supplies, makes it impossible to produce net income equal to previous years while adequately improving and maintaining your railroad and giving shippers efficient and satisfactory service."

ALGERIA

New 57-mile phosphates line

A 57-mile branch line is being constructed to connect Bir-el-Atar with Tebessa to carry phosphate rock from the new workings of the Djebel Onk. It is expected to be opened for traffic in 1962 and its estimated cost is N.Fr.47,800,000.

EIRE

Developments at Galway

The increasing importance of Galway as a transport centre has decided the C.I.E. administration to establish an area headquarters there and to remodel the station and yard. Among other

improvements to enable over 1,000 passengers to be dealt with at a time is a new platform. This has also allowed the schedule of a train from Limerick to be cut by 30 min. New sidings and roadways providing a new separate approach to them will relieve existing traffic congestion considerably. The Area Management offices will include accommodation for engineering, operating, sales, personnel, and accounting staff. The office of the Galway District Manager, Mr. R. N. Butler, will also be in this building.

VICTORIA

Special wagons of great size

At the Newport workshops of the Victorian Government Railways, a special wagon is being built for the carriage of heavy electrical plant. Capable of carrying 173 tons, it is 88-ft. long, and has a width adjustable from 9 ft. 8 in. to 11 ft. 10 in. for abnormally wide loads. The tare weight is 67 tons so that when loaded it may weigh as much as 240 tons. This great load is distributed over four bogies having in aggregate 24 wheels. About nine months ago, a 150-ton wagon was built to carry the State Electricity Commission's heavy stators. It is a well wagon and is carried on four six-wheel bogies removed from tenders of "S" class Pacific locomotives.

First V.R. 4-ft. 8½-in. gauge locomotive

The first Victorian 4-ft. 8½-in. gauge locomotive purchased for ballast-train work on the Albury-Melbourne construction is a 650-h.p. diesel-hydraulic very similar to 5-ft. 3-in. gauge "W" class engines.

EAST GERMANY

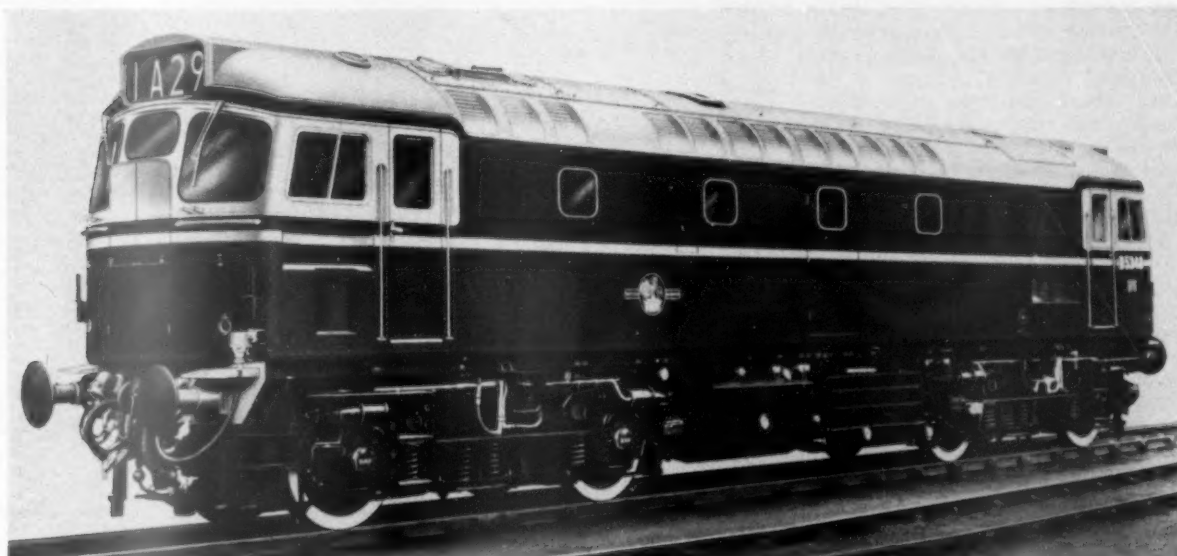
Ferry to Denmark

The East German Deutsche Reichsbahn is to establish a ferry service between Warnemuende in East Germany and Gedser in Denmark, from which there is also a ferry connection with West Germany. The new East German ferry vessel is of 7,000 tons and carries 1,000 passengers, 40 motor-cars and 14 railway wagons.

SWEDEN

State Railways 3,600-h.p. locomotives

The last of eight express "Rapid" locomotives ordered by the Swedish State Railways has been delivered by Nydqvist, & Holm A.B., Trollhattan, the Swedish manufacturers. They are the fastest in Scandinavia and have a maximum speed of 93 m.p.h. Engine output is 3,600 h.p. and maximum tractive effort about 30,000 lb. The locomotives are 49-ft. long and weigh 62 tons.



Type "2" diesel-electric locomotive

SECOND SERIES OF BIRMINGHAM-BUILT Type "2" diesel-electric locomotives

THE first of a further 69 Type "2" diesel-electric locomotives for British Railways was recently handed over for service. Generally very similar to the previous Sulzer-engine locomotives built by the Birmingham Railway Carriage & Wagon Co. Ltd. in 1958, reviewed in *The Railway Gazette*, November 28, 1958, they differ mainly in being fitted with electrical equipment manufactured by the General Electric Co. Ltd., and in having the engine output increased to 1,250 h.p. by the inclusion of an inter-cooler incorporated on the Sulzer engine. A further difference is that these locomotives are equipped with Westinghouse brake equipment of special lightweight design.

Engine unloading

The locomotives are geared for a maximum speed of 90 m.p.h. and, in view of the importance of having the maximum power available at the higher speeds for operating passenger trains, the transmission has been designed to absorb the full engine output up to 80 m.p.h. The amount of engine unloading which occurs between this point and the maximum speed is not such as to affect significantly the performance of the locomotive.

The design is to the requirements of Mr. J. F. Harrison, Chief Mechanical Engineer, and Mr. S. B. Warder, Chief Electrical Engineer, British Transport Commission, acting jointly, but sponsorship has been vested in Mr. T. C. B.

Engine power increased from 1,160 h.p. to 1,250 h.p. and General Electric equipment fitted

Miller, Chief Mechanical & Electrical Engineer, Eastern Region, to whom the first 20 of the earlier locomotives were supplied. The new locomotives are destined for service in the Scottish, North Eastern, and London Midland Regions, but all will be commissioned at Doncaster before being transferred to their operating region.

To suit the varying operating requirements of the Regions, there are certain detailed differences between the locomotives. For example, the 23 for the Scottish Region will be fitted with tablet catcher equipment, while the nine for the North Eastern Region will be without train heating boilers.

The locomotives are designed for the operation of up to three in multiple under the control of one driver.

Leading particulars are as follow:—

Axle arrangement	...	...	Bo-Bo
Top speed	...	...	90 m.p.h.
Unloading speed	...	...	80 m.p.h.
Starting tractive effort	...	...	40,000 lb.
Continuous rated T.E.	...	25,000 lb. at 14 m.p.h.	
Weight with full fuel supplies	...	...	73½ tons
Fuel capacity engine	...	...	500 gal.
Fuel capacity train heating	...	...	100 gal.
Water capacity train heating	...	...	550 gal.
			ft. in.
Wheel dia.	...	...	3 7
Bogie wheel base	...	...	10 0
Bogie centres	...	...	29 0
Overall length	...	...	50 9

Improvements have been made due to

experience gained in service, to increase the accessibility of the locomotive equipment and to provide a greater degree of driver comfort. Each cab is now fully finished with plastic materials to provide easy-clean surfaces throughout. The driver's and engineer's desks have been equipped with fibreglass panels and access doors, which at the same time provide an attractive finish to the desks and allow easy access to the master controller and control buttons fitted beneath the desk tops. An inner gangway door has been included with special attention being given to the provision of adequate draught excluders. The cab floors are now entirely removable by means of lift catches and are covered with an oil resisting linoleum.

Translucent roof

The engine room has been provided with a translucent roof trap, moulded in fibreglass-reinforced polyester resin and fitted with quick release fasteners, to avoid any necessity for operating staff to work on the roof of the locomotive, thus removing any potential danger from overhead power cables.

The power unit is the Sulzer 6LDA28-B, the inter-cooled version of the pres-

sure-charged six-cylinder diesel engine with 280-mm. bore and 360-mm. stroke. This develops 1,250 h.p. continuous at 750 r.p.m. A total of 94 engines of this latest version has been ordered for British Railways, in two designs of locomotive, and 198 of the earlier non-intercooled 6LDA28 engines of 1,160 h.p. are already in service in other British Railways Type "2" locomotives.

The two engine versions are almost identical, the increase in output being achieved by a simple form of charge air-cooling, the intercooler being incorporated in the cooling water circuit so that separate radiator elements and an extra pump are avoided.

The single intercooler for the "B" version is an air-to-water three-flow cooler with round tubes of flat fins, the latter enabling the whole volume within the cooler to be occupied by active surface. The tube stack is fitted directly in a wide portion of the induction manifold between the pressure-charger and the engine, thus making the intercooler an integral part of the engine. Cooling water is derived from the main engine-cooling circuit, thus eliminating the need for a separate water circuit with additional piping, radiator and pumps.

Interchangeability

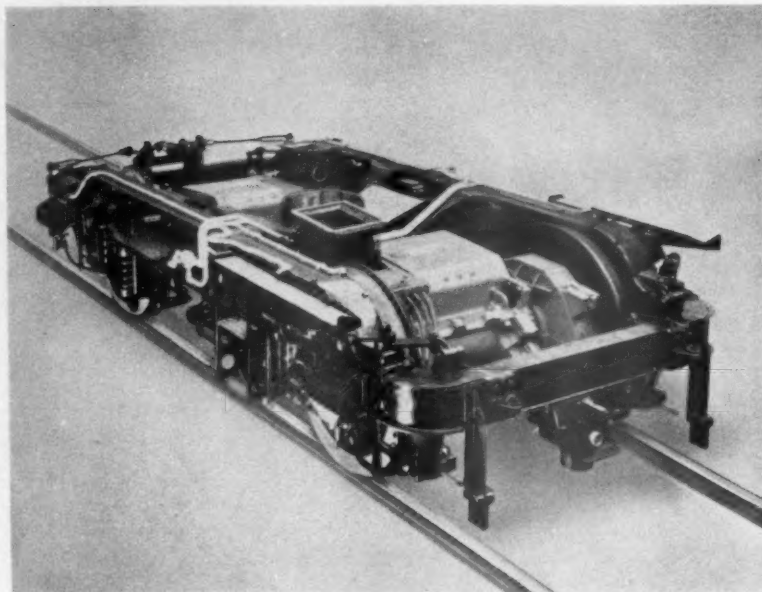
To afford complete interchangeability, the governor setting is identical for the full range of Sulzer LDA28 engines with



Wide gangway alongside in-line engine

six, eight and 12 cylinders, of both "A" and "B" versions (190 and 210 h.p. per cylinder respectively). The difference between "A"- and "B"-type engines lies in the fuel pumps which for the latter type include a larger-diameter plunger to give the extra amount of fuel for the increased output.

The main generator type WT. 981 is a 10-pole single-bearing machine with four field windings; separately-excited,



General view of bogie

self-excited, reverse-series and starting. It has a fabricated frame, and is rated at 805 kW., 19,40 A. at 750 r.p.m.

Both main and auxiliary generator armatures are mounted on a common cast-steel hub, which is bolted solidly to the engine crankshaft flange and is carried in a single roller bearing at the outer end. Advantage has been taken of the necessarily large diameter of the medium-speed main generator partially to recess the auxiliary generator into it, and so keep the overall length of the set to the same figure as with the previous main generator, notwithstanding the required increase in output.

To facilitate maintenance of the brush-gear, the brush holders are mounted on a rocker which can be revolved through a gear drive so that they can be brought to a convenient position for service attention. Both machines are self ventilated by one fan on the main armature which discharges the cooling air downwards to atmosphere through trunking in the underframe. Provision is made on the fan disc for barring the engine by hand.

The 57-kW. auxiliary generator type WT. 782 is a six-pole machine the output of which is maintained at a substantially constant voltage of 110 by means of an automatic voltage regulator.

Control scheme

The scheme is designed to ensure that the engine output is absorbed by the transmission over the widest range of locomotive speed, without overloading the engine within this range, and this is accomplished by a combination of generator voltage control and motor field control.

Generator excitation is obtained by a

combination of the separately-excited and self-excited fields, and the output is controlled by a resistance in the separate-field circuit adjusted by the load regulator under the control of the engine governor.

A four-motor reverser of new and compact design is incorporated, giving an appreciable saving of space and the conventional battery contactor and reverse current relay are replaced in the charging circuit by a silicon diode rectifier which blocks reverse currents from the battery.

The bulk of the control gear is housed in one main control cubicle, mounted in the engine compartment against the bulk-head separating this from the boiler compartment, and adjacent to the main and auxiliary generators. The cubicle is divided into two parts, one accommodating the main power equipment and the other the auxiliary gear.

Traction motors

Four axle-hung traction motors, Type WT.459, are connected in parallel across the output of the main generator, driving through resilient gears of Wiseman manufacture. These machines are force-ventilated four-pole series motors of robust construction. With the exception of the gear ratio and suspension bearings.

As in the case of the main generator, the brushgear is rotatable to enable all service attention to be given from below the machines, and the motor noses are resiliently supported by Metalastik units. The continuous rating of each machine is 236 h.p., 485 A., 415 V. and the gear ratio is 17:60.

The radiator fan is driven by a 16-h.p.,

Continued on page 277

THE NEW PASSENGER TIMETABLE in the Western Region

It is a very long time since any radical revision of the Western Region timetable took place. Before the war, the Great Western Railway had reached a high standard of efficiency with a timetable which had evolved over many years and which admirably met the public need. The trains were sufficiently frequent for the traffic offering; they were fast and they were punctual.

It was only natural, therefore, that when the war ended, there was a strong desire to return to the pre-war timetable as quickly as possible. It took several years for the nation to return fully to peacetime ways. In the interim, the railways were nationalised. When the disturbance caused by this change in organisation had died away, it was found to be impracticable to return to the pre-war timetable.

Change in public habits

In the first place, the habits of the travelling public had changed. Car travel was rapidly increasing; travel by rail was also well above pre-war levels for longer distances; short-distance rail traffic was disappearing. Additional trains were necessary on the main lines, especially at weekends when the general introduction of holidays with pay greatly increased holiday traffic. Intermediate stops which had been introduced into main-line trains as a wartime measure, had become established and were attracting a sufficient volume of civilian traffic to justify their retention. Business men and women were prepared to start earlier in the morning and return later in the evening than in pre-war days.

Shortage of staff

In the second place, pre-war standards of speed and punctuality were no longer possible without drastic restrictions on the loads of the train. This was largely due to the fact that the high-volatile coal, for which the Great Western steam locomotives were designed, was no longer available in sufficient quantities. At the same time, the country had entered an era of full employment and the railways were being denuded of staff, especially in the operating and motive power grades. This increased the difficulties of both passenger and freight-train operation and led to breakdowns in engine diagrams. These factors reacted on the maintenance of the locomotives.

Thirdly, the maintenance of the track, which had suffered badly during the war years, had now to be restored to peace-

time standards. Gradually semi-permanent restrictions of speed were eliminated but many temporary restrictions were necessary while the job was done. This led to a great deal of unpunctuality and public complaint.

Compromise timetables

Any timetable under these conditions was bound to be something of a compromise. To re-establish public confidence, the "Bristolian" was restored at pre-war timings and the "Cornish Riviera" and "Torbay" expresses were accelerated to pre-war speeds. Neither train was able to convey pre-war loads. Additional trains were timed as nearly as possible according to the pattern which had been established before the war, and some fast runs were made, notably with the "Pembroke Coast Express," 2 hr. 30 min. between Paddington and Cardiff with a stop at Newport and the "Cambrian Coast Express," 2 hr., between London and Birmingham with a stop at Banbury. The loads of these trains were severely limited and the standard of punctuality left a great deal to be desired. To cater for public demand, extra coaches were often necessary and in consequence trains had to be retimed. This retiming was not a satisfactory answer to the problem, because the travelling public could not be advised of the alterations before they arrived at the station for their train, and it was naturally assumed that the train was late. The retiming of one train often necessitated alteration to others and, at holiday times, it was not unusual for more than half the main-line trains to be running at times other than those at which they were publicly advertised.

Fresh approach

A timetable on this basis was clearly unacceptable as a permanent arrangement. Two important factors have now made possible an entirely fresh approach. The reconditioning of the track has been completed and the use of machines to maintain it has reduced delay caused by temporary restrictions of speed. Long-

Fixed-interval departures, better time-keeping, and economic use of stock

by **L. W. IBBOTSON, M.B.E.**, Assistant General Manager (Modernisation), Western Region, British Railways

welded rails with concrete sleepers are gradually coming into service and this will still further reduce speed restrictions for maintenance purposes. These factors have made it possible to draw up a plan for track maintenance which can be incorporated in the timetable with less disturbance to punctuality than formerly.

The coming of the diesel locomotive has now provided a more powerful prime mover. The improvement in the driver's conditions and view, together with the fact that the fuel has no longer to be fed into the machine by hand under conditions of considerable difficulty, results in a more certain standard of performance than is possible with steam engines under present-day conditions.

Alternative solutions

The time is propitious for a new timetable but of what kind? It is obvious that any disturbance of long-established trains may lead to complaint, but this would have to be faced to establish the timetable on a better basis. There are two possible lines of action. One is to run a series of prestige trains at the fastest possible speeds and with limited loads, supplemented by a large number of less fast trains which would carry the bulk of the passengers. The other method involves a standard timetable, with all trains running at similar speeds, spread as evenly as possible. The first alternative was rejected for reasons explained below and the new timetable has been based on the principle of departures from the main stations at fixed intervals. As far as possible, these departures are at times which are easily memorised.

The chief factor which led to this decision was that of economics. The high-speed non-stop prestige train, with a limited load, does not cater for the intermediate passengers, however numerous and important they may be. Other trains must be run to do this work and the result is often that two trains are run to do the work which one could do at much less cost. A service of this type, incorporating both very high-speed non-stop trains and slower trains with a

number of intermediate stops, does not easily fit into an interval pattern, besides being costly to operate.

The validity of these arguments depends to a great extent on geography. There is no main line on the Western Region without towns of considerable importance between the main centres of population. With the increased use of cars and buses and the consequent closure of branch lines, these intermediate towns are gaining increased importance as railheads. For instance, between London and Birmingham. High Wycombe, Bicester, Banbury, and Leamington provide considerable traffic, while the same trains usually serve Wolverhampton, Wellington (Salop), Strewsbury, Gobowen, Ruabon, Wrexham and Chester on the way to Birkenhead. Between London and South Wales, there are demands for stops at Reading, Didcot for Oxford, and Swindon.

Outstanding example

The outstanding example is the West of England route where Reading, Newbury, Westbury, Taunton, Exeter, Dawlish, Teignmouth, Newton Abbot and Totnes, have to be served between London and Plymouth, in addition to the populous and popular Torbay area. Beyond Plymouth lies the whole of Cornwall, to be served by a trunk line nearly 80 miles long from Plymouth to Penzance.

For a time after the war, the first train serving the more important intermediate stations on the West Country route left Paddington either at 11 a.m. (Summer) or at 1.30 p.m. (Winter), as the 10.30 a.m. carried a slip coach only for Westbury and Weymouth and the 12 noon made its first stop at Exeter. Then the 9.30 a.m. was put on calling at Reading, Westbury, Taunton, Exeter, Newton Abbot and Totnes before terminating at Plymouth. This is a very useful train but it carries no through Torquay portion and precedes the 10.30 a.m. into Plymouth by only 20 min. Consideration has been given to diverting it to the Torquay line, but if this were done the connection from the inter-

mediate stations to Cornwall would be lost and would revert to the 1.30 p.m. The Torquay line, in consequence, still has to rely on the 12.30 p.m. train from Paddington for the first through service.

Better use of trains

In the new timetable this situation has been dealt with by making better use of the 10.30 a.m. and 12.30 p.m. trains as shown in Table 1. Similar alterations have been made in the Up direction.

It will be seen that the through service to the Torquay line has been increased from four trains to six (seven April to October) and that the intermediate stations have a much better service to and from London as well as to and from Devon and Cornwall. At present the Torquay line portions are detached and attached at both Exeter and Newton Abbot. In the new service, this will be done at Newton Abbot except in the case of the "Cornish Riviera," where it will be done at Exeter to avoid a Newton Abbot stop in the Penzance portion. The reason for this change is that the layout at Newton Abbot was specially devised for this work whereas at Exeter the absence of the necessary cross-over makes it rather more difficult.

As a result of this change, the number of through services to and from Dawlish and Teignmouth—formerly given by the Torquay line portion detached and attached at Exeter—has been reduced. A connection will be provided by multiple-unit diesel to and from Exeter which is required in any case to serve other stations.

Modern practice

Other features of the new service are the earlier departures in the morning and later departures in the evening. This is in line with modern practice on other routes and should prove popular, especially with the business community.

The principal adverse criticism on the new service arises from the abolition of the non-stop run between London and Plymouth of the "Cornish Riviera" and between London and Exeter of the "Torbay Express." This has been caused solely by the introduction of additional

stops and not by any deceleration in the running times. This is shown in Table 2.

The introduction of the 11.30 a.m. Paddington and corresponding return train will meet the need for a non-stop train when the traffic offering justifies this being done.

In the Winter, both the "Cornish Riviera" and "Torbay Express" have much spare room, even though the number of coaches is only ten and seven respectively. This can be seen from the following figures taken during February/March, 1961:—

		Percentage of seats occupied	
		1st	2nd
10.30 a.m. Paddington (leaving London)	...	48	53
10 a.m. Penzance (leaving Plymouth)	...	46	64
12.30 p.m. Paddington (leaving London)	...	60	65
11.25 a.m. Kingswear (leaving Exeter)	...	46	54

From April to October, the trains load well and the 11.30 a.m. train will cater for the through traffic between London-Plymouth and Torquay. This train will run non-stop between Paddington and Newton Abbot, conveying both Plymouth and Kingswear portions. The through journey times compare with existing trains as shown below:—

			hr.	min.
10.30 a.m. Paddington	London—Plymouth	4	0	
11.30 a.m. Paddington	London—Plymouth	4	5	
10 a.m. Penzance	Plymouth—London	4	10	
11.30 a.m. Plymouth	Plymouth—London	4	11	
12.30 p.m. Paddington	London—Torquay	3	27	
11.30 a.m. Paddington	London—Torquay	3	38	
11.25 a.m. Kingswear	Torquay—London	3	35	
11.22 a.m. Kingswear	Torquay—London	3	45	

The timings of the London-West of England trains are based on the performance of the 2,200-h.p. D8XX class diesel locomotives, as computed by the Chief Mechanical & Electrical Engineer of the Western Region, and provide a reasonable margin for additional coaches and track maintenance restrictions. The delivery of the new 2,700-h.p. diesel locomotives will start at the end of this year and in due course they will come into service on this route. Faster timings will then be possible on all the London expresses.

London-Bristol service

The service between London and Bristol illustrates another feature of the new timetable. The present train service conforms to no pattern, as will be seen from the table below. In consequence, the service is expensive, both in the use of locomotives and coaching stock.

Difficulty was experienced in finding suitable paths for the diesel Pullman trains when they were introduced last winter. It was decided to put on the morning and evening trains which more or less duplicated existing trains, with the result that the earnings have not been as good as might have been expected. In the new service, the diesel Pullmans have been formed into the hourly pattern of trains leaving Paddington from 7.45 a.m.-7.45 p.m. and Bristol from

Table 1

<i>Presents Service</i> (Monday to Fridays)	
9.30 a.m. to Plymouth, calling Reading, Westbury, Taunton, Exeter, Newton Abbot.	
10.30 a.m. to Penzance non-stop to Plymouth.	
11.30 a.m. to Plymouth (Summer) calling Reading, Newbury, Taunton, Newton Abbot, Totnes and Brent.	
12.30 p.m. to Kingswear calling Exeter, Torquay, Paignton.	
1.30 p.m. to Penzance (Kingswear Portion) calling Reading, Newbury, Westbury, Taunton, Exeter, Newton Abbot and Totnes.	
3.30 p.m. to Penzance (Kingswear Portion) calling Westbury, Taunton, Exeter.	
5.50 p.m. to Plymouth (Kingswear Portion) calling Newbury, Taunton, Exeter.	

<i>Future Service</i> (Mondays to Fridays)	
8.30 a.m. to Penzance (Paignton Portion) calling Reading, Newbury, Westbury, Taunton, Exeter, Dawlish, Teignmouth, Newton Abbot.	
10.30 a.m. to Penzance (Kingswear Portion) calling Taunton, Exeter.	
11.30 a.m. to Penzance (April-October) (Kingswear Portion) calling Newton Abbot.	
12.30 p.m. to Kingswear (Penzance Portion) calling Reading, Westbury, Taunton, Exeter, Newton Abbot.	
2.30 p.m. to Penzance (Kingswear Portion) calling Taunton, Exeter, Newton Abbot.	
4.30 p.m. to Truro (Kingswear Portion) calling Reading, Westbury, Taunton, Exeter, Newton Abbot.	
6.30 p.m. to Plymouth (Paignton Portion) calling Newbury, Westbury, Taunton, Exeter, Newton Abbot.	

Table 2

		"Cornish Riviera Express"	
		<i>Present timetable</i>	<i>New timetable</i>
		Hr. min.	Hr. min.
London—Taunton	...	2 16 (Passing Taunton)	2 17 (stop at Taunton)
Taunton—London	...	2 23 (Passing Taunton)	2 21 (stop at Taunton)

7.15 a.m.-6.15 p.m. Details of the existing and new services are given below in Table 3.

Not only does the new service give a wider choice of trains, but the even spacing makes the best possible use of diesel locomotives and coaching stock. Over the Region as a whole, the new service has made possible a 15 per cent saving in the number of coaches required.

Here again, the alterations have given rise to some criticism. The formation of the "Bristolians" has been increased from seven to ten coaches and a stop at Bath inserted in both directions. This has saved duplicate mileage but increased the journey time between London and Bristol by 14 min. The fast runs of the diesel Pullmans have been maintained.

Alterations criticised

The alteration to long-established morning and evening services is also criticised. The new service has many advantages from the travellers' point of view and is much more economical to work. It also overcomes a long-standing difficulty approaching London in the morning, which has been the cause of much late running, especially in the winter months.

A third feature of the new timetable can be illustrated by the South Wales service. Here little change has been made, because for some years the trains have run at standard times both from London and Cardiff. The adoption of a similar pattern for the other main services to and from London has made it possible to give each train a proper margin at converging junctions and place them in better sequence.

Delay avoided

In the new timetable, the Bristol trains, which are normally lighter than the South Wales trains, will precede in each direction. A clear margin will exist at Wootton Bassett where the Up trains converge, which should avoid the delay which has occurred at this junction in the past. This has even more importance at present when the Bristol trains are worked by diesels and the South Wales trains by steam locomotives. The timings will still hold good when the South Wales trains can be accelerated with the coming of the 2,700 h.p. diesels.

The London-South Wales service is

based on a train every hour from 7.55 a.m. to 6.55 p.m. from London and from 8 a.m. to 7 p.m. from Cardiff, but for reason of economy, it has not been considered wise to fill the gaps which exist at 9.55 a.m. and 12.55 p.m. in the Down direction and 11 a.m., 1 p.m., 2 p.m. and 6 p.m. from Cardiff in the Up direction. When diesel locomotives are introduced, it will be advantageous to fill at least most of these gaps to obtain the best use of these costly units and provide a better service on this popular route.

Third diesel Pullman

The most important development in the new timetable is the introduction into daily service of the third diesel Pullman train, built for the Western Region. Many requests have been received for the existing locomotive hauled "South Wales Pullman" to start from Swansea in the morning instead of London. This could not be done because of the absence of a suitable return path from London in the evening. The new pattern of service now makes possible a path at 4.55 p.m., which has been allocated to the Pullman. In the Up direction, the Pullman will leave Cardiff just ahead of the 8 a.m. standard train, which has always been heavily loaded. It remains to be seen whether this will prove to be the best path.

The remaining express services from London are to Birmingham and Birkenhead and to Oxford, Worcester and Hereford. These may serve to illustrate the last feature of the new timetable—stability. The main structure of each service remains the same, i.e., hourly between London and Birmingham, two-hourly between London and Hereford. The present hourly pattern between London and Birmingham was instituted when the work on the London Midland Region electrification caused the transfer of the express traffic to the Western Region route and is likely to continue for the next four or five years.

Timekeeping improved

These trains have often required more coaches, but the steam locomotives could not take the additional vehicles without re-timing. The new timetable makes allowance for this factor and there should be a substantial improvement in time-keeping. Acceleration will be possible

when the 2,700-h.p. diesel locomotive, come into service on this route next years

Apart from altering the departures from Paddington from 45 min. past the hour to 15 min. past the hour, the London-Hereford service is little changed.

As with many wide-scale changes of this kind, the new service must be subject to scrutiny in the light of experience. It is designed to operate throughout the year except on summer weekends, when an altogether different type of train service is required. When it has settled down and become stabilised, the number of alterations should be few and it is hoped that the main structure can remain unchanged for many years.

The aim is to offer a better, more frequent and more reliable service which will attract additional revenue with less mileage (reduced by 4 per cent), and more economical use of locomotives and rolling stock. Stage 1, which consists of the service to and from London, comes into operation on September 11. Stage 2 comprises the cross-country trains, and the summer Saturday Only service will start on June 18, 1962. This revision of the timetable is the hard work of experienced staff over a long period, and it is hoped that it will play a part earning for the Western Region a reputation for punctuality and enterprise and so improving the financial results.

Second series of Birmingham-built Type "2" diesel-electric locomotives

Concluded from page 274

G.E.C. Type WT.142 motor having two speeds—840 and 1,500 r.p.m.—under thermostatic control, the higher speed being obtained by a field tapping.

Twin blowers of Aerex Hyperform radial type, each supplying cooling air to two traction motors, are driven by a single motor, G.E.C. Type WT.106. This is also a two-speed machine running as a compound motor at slow speed and a series machine at high speed.

Two Northey exhausters are driven by integrally-mounted G.E.C. motors Type WT.138, these again being two-speed machines, normally running at the lower speed to maintain vacuum, but being speeded up for brake release under the control of the brake valve contacts.

Subcontractors for these locomotives include the following:—

Table 3 Leaving Bristol

Present	New
7.40 a.m. (Pullman)	7.15 a.m.
7.45 a.m.	8.15 a.m. (Pullman)
8.50 a.m.	9.15 a.m.
9.35 a.m.	10.15 a.m.
11.30 a.m.	11.15 a.m.
12.30 p.m. (Pullman)	12.15 p.m.
1.30 p.m.	1.15 p.m.
3 p.m.	2.15 p.m.
4.15 p.m.	3.15 p.m. (Pullman)
4.30 p.m.	4.15 p.m.
5.27 p.m.	5.15 p.m.
6.25 p.m.	6.15 p.m.
7.40 p.m.	7.45 p.m.

Leaving London

Present	New
7.30 a.m.	7.45 a.m.
8.45 a.m.	8.45 a.m.
9.5 a.m.	9.45 a.m.
10.5 a.m. (Pullman)	10.45 a.m.
11.5 a.m.	11.45 a.m.
1.15 p.m.	12.45 p.m. (Pullman)
1.40 p.m.	1.45 p.m.
2.35 p.m.	2.45 p.m.
2.55 p.m.	3.45 p.m.
4.5 p.m.	4.45 p.m.
4.45 p.m. (Pullman)	5.45 p.m. (Pullman)
5.5 p.m.	6.45 p.m.
6.30 p.m.	7.45 p.m.
7.15 p.m.	
8.5 p.m.	

Engine	Sulzer	Bros. (London)
Electrical equipment	General Electrical Co. Ltd.	
Brake equipment	Westinghouse Brake & Signal Co. Ltd.	
Exhausters	Northey Rotary Compressors Limited	
Radiators	Serck Radiators Limited	
Train heating boiler	J. Stone & Co. (Deptford) Ltd.	
Batteries	Nife Batteries Limited	
Traction motor blowers	Aerex Limited	
Fire extinguishers	Pyrene Co. Ltd.	
Windows	Beckett, Laycock & Watkinson Limited	
Wheels and axles	Owen & Dyson Limited	
Axleboxes	Skefko Ball Bearing Co. Ltd.	

CENTRALISED TRAFFIC CONTROL in the North Eastern Region

ONE of the very interesting signalling developments now taking place on the North Eastern Region of British Railways is the installation of the first centralised traffic control scheme in this country, on a section of the York-Hull line via Market Weighton between Bootham Junction (near York) and Beverley—a distance of 31½ miles.

Centralised traffic control schemes are in use in many other countries and several members of the Chief Signal & Telecommunications Engineer's staff at York have had the privilege in recent years of seeing a number of installations in Denmark, Italy, and France, during the annual conventions of the Institution of Railway Signal Engineers, and the information obtained has proved most useful.

Detailed examination

First conceived about four years ago, the scheme includes singling of the line with passing loops of approximately one mile in length at Pocklington and Market Weighton, and the equipping of 19 of 23 level crossings with automatic half-barrier installations. Signalling arrangements on this section will be controlled from a panel in York signalbox.

As is well known, the provision of C.T.C. on existing double lines usually is not an economical proposition, and it had to be ascertained whether the scheme was worth developing. A complete study of the financial and traffic developments, and the effects of singling the line using C.T.C. techniques was therefore undertaken in collaboration with all departments concerned. It was concluded that, in this case, the scheme was economic, and it was decided to carry out a more detailed examination with a view to obtaining approval in principle from the management.

Approval in principle was given by the British Transport Commission on the understanding that a further submission would be made when plans had been finalised and firm estimates obtained.

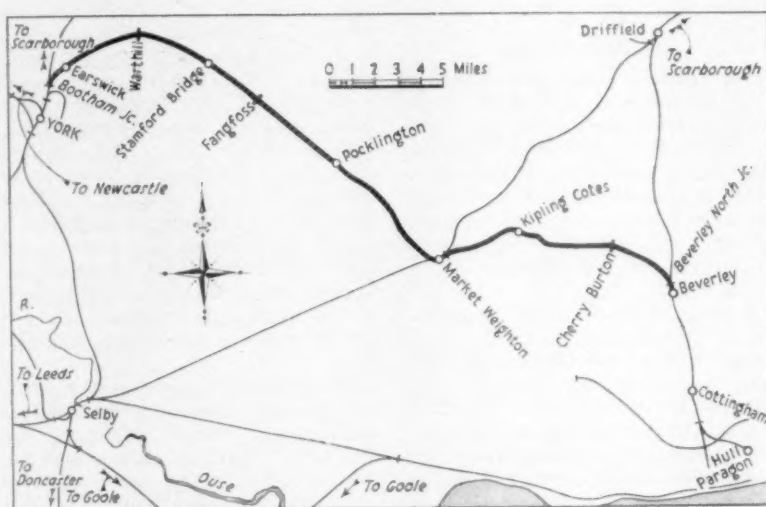
Automatic barriers

A comprehensive dossier of the details of each of the 23 crossings, including photographs, was prepared so that the implication of the project could be carefully analysed by local and highway authorities.

It was felt that the introduction of automatic barriers on the scale contemplated in such a confined area might give rise to many problems if orthodox

First part of a more extended scheme expected to yield valuable data on application of C.T.C. in this country

by W. L. CARTWRIGHT, Assistant to Chief Signal & Telecommunications Engineer (New Works), British Railways, North Eastern Region



Section of York-Hull line on which C.T.C. is being installed

methods were used, and the Assistant General Manager (Traffic) arranged to meet officials of local highway authorities, so that, when the question of obtaining formal approval of the work associated with the crossings was requested by the B.T.C., they would be fully aware of all the ramifications.

Specification prepared

The scheme plan was also submitted to the Inspectorate (Road & Railways Sections) of the Ministry of Transport for consideration, and a meeting between the Ministry and Officers of the North Eastern Region was held. As a result, the scheme was amended and finalised.

A specification was prepared, firm tenders invited, and the scheme finally authorised on December 20, 1960. A contract was placed with the Westinghouse Brake & Signal Co. Ltd. for the supply and installation of C.T.C. equipment including control panels, colour-light signals, point machines, and barriers.

The salient features of the scheme are as follow:—

1. The excessive road traffic passing over Haxby Road, Earswick, and Market

Weighton West Crossings is such that, under present regulations, it is not possible to replace the existing form of protection by automatic half-barriers. These three crossings will be operated locally, being released by the C.T.C. operator in York signalbox.

2. Although under consideration, the closure of the Selby-Driffield via Market Weighton branch may not have been authorised by the time the C.T.C. is commissioned, and it was necessary to cater for this eventuality. Market Weighton East and West signalboxes will temporarily remain, being opened as required to work traffic on and off the branches. Market Weighton West signalbox will normally function as a gate box, being released by the C.T.C. operator.

Half-barriers

3. While the principle of installing automatic half-barriers at Stamford Bridge, Pocklington Station, West Green, and Barnby has been agreed to, local conditions at each of these crossings require temporary supervision to ensure that the public fully understands the

implications of the system.

4. It is proposed to close Shipton Lane and to divert the road through Londesborough Goods Yard into the road leading over Londesborough Station Crossing.

5. At 19 of the 23 crossings covered by the scheme, the existing forms of protection will be replaced by lifting barriers automatically operated by the passage of trains.

Normally, barriers will be in the raised position, allowing free access for road traffic. They will be lowered on approach of a train without the attendance of a crossing-keeper. Flashing red traffic signals at all the crossings will give approaching road users a 7-sec warning before the barrier begins to descend, and two-tone gongs at each side of the crossing will amplify this warning.

Further safeguard

The time taken by a train to reach the crossing when travelling at maximum permissible speed will be 19 sec. from commencement of the warning. This time interval comprises 7 sec. for the warning period, during which time the flashing lights and gongs function, a further 7 sec. representing the time taken for the barrier to descend, and a final interval before the arrival of the train, of 5 sec. after the barriers are completely down. When the barriers reach their lowered position the gongs cease to function, but the flashing red traffic signals continue to give warning all the time the barriers are obstructing the road. In addition to the flashing lights there are two steady red warning lamps mounted on the barrier booms, and these remain lit all the time the barriers are down.

As a further safeguard, the booms will be conspicuously coloured in alternate red and white bands covered with a retro-reflective material which will cause them to stand out very clearly during the hours of darkness.

On the section of double track where there are to be automatic half-barriers, provision has to be made for cases where two trains, one on the Up and one on the Down line, are approaching simultaneously. Although they may approach the crossing together they will not necessarily reach it at the same time. Therefore the equipment will be so designed that the barrier will remain down with flashing red lights in operation until both trains have cleared the crossings.

Illuminated warning

To discourage the impatient motorist from pulling out of his proper traffic line and zig-zagging in between the barriers, an indicator placed on the off-side of the road, and in line with the barrier displaying the warning "Second train coming," will be illuminated. Telephone communication with the C.T.C. operator or local control point

will be provided for the road user in event of an undue delay.

If the apparatus itself fails, the barrier booms will be counter-weighted to fall to the "safe" position and an audible warning signal transmitted to the C.T.C. operator or the local control point.

The barriers will be electrically operated with the exception of the set to be installed at Pighill Crossing. This will be of "Saxby" hydraulically operated type modified to meet Ministry of Transport requirements.

Control by C.T.C. operator

6. All wayside station sidings ground frames will be released by the C.T.C. operator as necessary. It will be seen from the scheme plan that, in places where an automatic crossing ahead of a wayside siding is so near the connection, a train calling at the siding would cause the barriers to be lowered until such time as the shunting operation was completed and the train had cleared the crossing. To prevent this happening the (barrier) track circuit has been split in two sections and two notice boards provided, e.g., at Warthill Ground Frame.

A train requiring to shunt will stop at the first notice board and a member of the crew will telephone the C.T.C. operator asking for the ground frame to be released. When this has been done the occupation of the first section of the (barrier) track circuit will now not control the barrier equipment. The second notice board must not be passed during shunting operations, as the second section of the (barrier) track circuit is free of any controls and, on being occupied, will operate the barrier equipment.

This section of the (barrier) track circuit is sufficiently long to operate the barriers through its complete cycle, in the case of a train resuming its journey after shunting,

without the ground-frame releasing arrangements having been restored.

Control panel

7. The C.T.C. control panel in York will be similar in design to the conventional modern signalling panel and not the usual type of C.T.C. panel installed extensively abroad. The panel will incorporate indication of track circuits, signals, points, barrier lights, position of barriers, signal post, and barrier telephones in their relative geographical positions, and an eight-day clockwork electronic circuits and monitoring traingraph recorder.

Provision has been made for emergency/maintenance panels at four of the seven field stations, i.e., the outside locations. These will be situated at Earswick, Pocklington, Market Weighton, and Beverley Pighill for the control of the loop points and relative signals in the event of failure of the remote-control equipment or for maintenance purposes. A sealed key at each point will operate a switch on the panel to transfer the control of the local interlocking from the C.T.C. operator to the field station. These panels will include all track-circuit, signal, point, and barrier indications, and the telephone facilities to signals and level crossings within their section of control.

The signalling is designed to provide for a 10-min. headway.

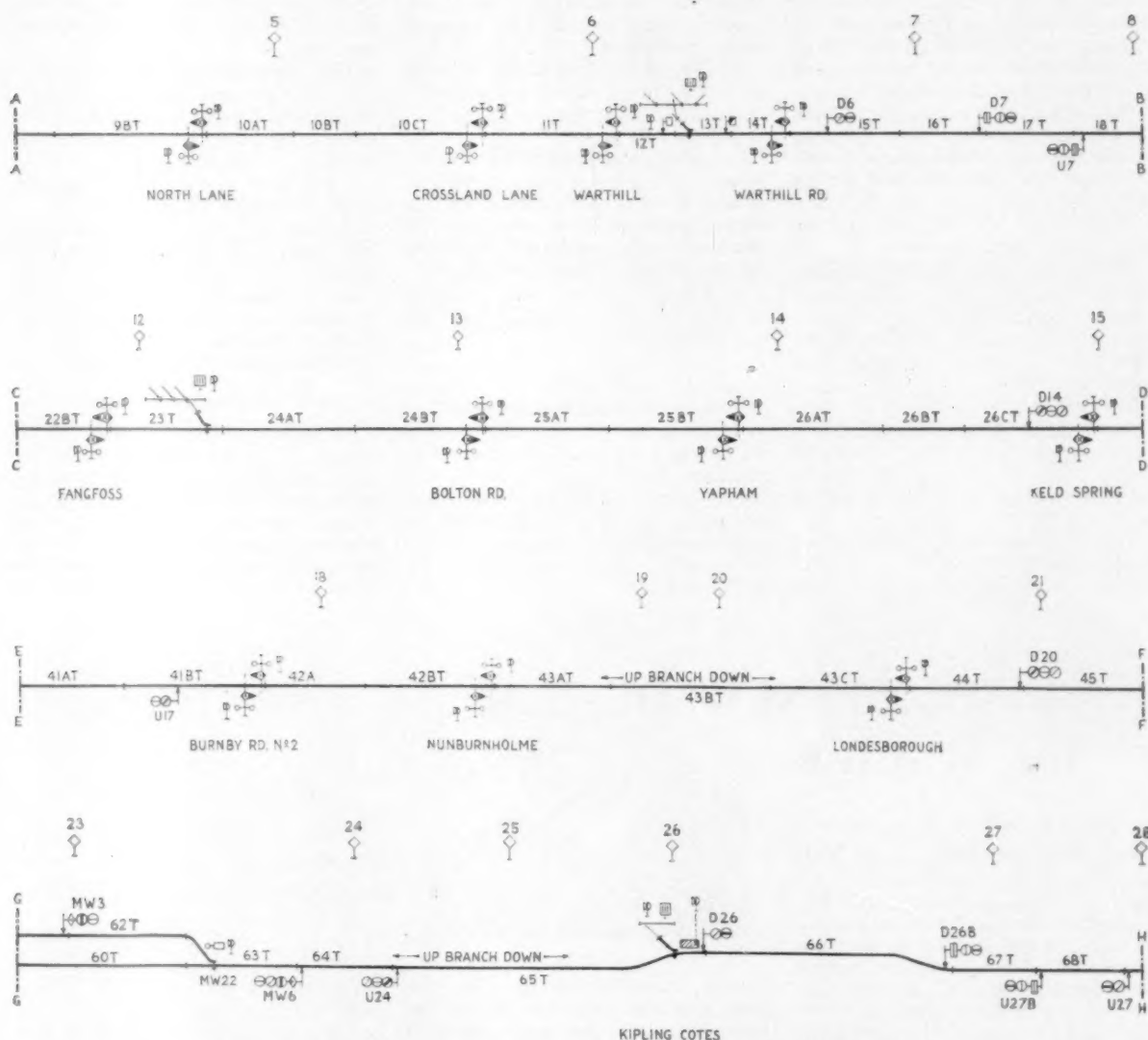
Use of transistors

The supervisory control system will be the "Westronic" C.T.C. multi-station transistorised remote control equipment provided by the Westinghouse Brake & Signal Co. Ltd. This equipment has been designed to make extensive use of transistors in place of electro-magnetic relays and uniselectors in the coding circuits,

Continued on page 281



Barrier gates at Warthill level crossing



Continuous diagrams showing the signalling on the Bootham Junction-Beverley line

Continued from page 279
and is based upon the "Westronic" single-station remote-control system.

In view of the use of electronic devices in the coding circuits, much faster operating speeds are obtained than would be practicable with an electro-magnetic system. Thus it is possible to provide for the transmission and reception of any revised information of some 300 to 400 controls and indications in approximately 1 to 2 sec., no matter how many of the revised controls and/or indications are initiated simultaneously.

To alter the position of a function at any field location, the operator has only to move the corresponding thumb switch or pushbutton. The fresh information he has set up will then be transmitted automatically to the correct field location without further action. No special code start-buttons are required. Similarly, a

change in position of any field function results automatically in the transmission of the revised indication information back to the office. This transfer will be achieved by carrier-frequency transmitters and receivers.

The signalbox control equipment will comprise four basic cubicles forming a single suite approximately 8 ft. long and will contain all the signalbox control and indication circuits, the only connection between this cubicle and the field equipment being a single pair of conductors.

The signalbox suite is to be arranged with two centre cubicles containing all electronic circuits and monitoring facilities. The outer cubicles will contain the power supply distribution panel, transmission control relays, and relays to register the indication information received from all field stations.

The centre "electronics" cubicles will

contain all "Master" and carrier circuits, the monitoring oscilloscope and associated monitoring panel, and the counting chain circuits. All electronic circuits will be fully transistorised and mounted on printed circuit boards which will plug in to their appropriate positions in the cubicle, thus allowing for ease of maintenance and replacement.

The comprehensive monitoring facilities will be in the form of a built-in oscilloscope and monitoring pushbuttons which will enable a functional check to be made of each part of the complete equipment, without the need to remove it from service. Should a fault occur, the monitoring facilities will allow the diagnosis and cure in the minimum space of time.

The field equipment at each of the seven remote locations will consist of cubicles similar to those of the signalbox but of approximately half the size. The

cubicles at each field location will house the equipment applicable to that particular site, and although they will be of a standard size they will be tailor-made to suit the size of each remote location.

Half of each field cubicle will contain all electronic circuits, the monitoring oscilloscope, and its associated monitoring panel. The other half will contain the transmission and registry relays associated with that location and the power supply distribution panel.

8. The interlocking between opposing running signals, including the intermediate automatic signals on the single-line sections, will be done locally by direct-wire and directional interlocking stick circuitry.

9. The Chief Mechanical & Electrical Engineer is negotiating with electricity boards concerned for the provision of electricity supply points at the various field stations from which supplies will be distributed.

The d.c. supplies for remote-control equipment will be supplied from trickle-charge batteries via carbon-pile voltage

regulators, thus ensuring a steady d.c. supply voltage over a wide range of battery conditions.

10. The scheme includes the provision of a wide range of telecommunication facilities and it is planned to install a carrier network system.

Communications will be divided in groups corresponding with the sections of line to be controlled from the field station panels so that, when switched into use, the appropriate telephone facilities will be automatically available.

A composite type of aerial cable is to be used for both signalling and communication purposes.

Progress

Detailed surveys of the level crossings to be equipped with automatic barriers have been completed and site meetings arranged with representatives of all interested parties with a view to obtaining informal approval of the proposals for each crossing before applying formally for an Order under Section 66 of the B.T.C. Act, 1957.

The sites for the field stations have been fixed and details of the buildings required finalised.

The preparation of plans associated with the Civil and Signal & Telecommunications Engineering is in hand and material for the work is being assembled on site.

It is planned to commission the scheme in the following three stages:—

1. Bootham Junction to Pocklington. (This section will be controlled by local panels.)

2. Pocklington-Market Weighton, and the commissioning of the C.T.C. panel in York signalbox.

3. The complete scheme.

Conclusion

Further sections of line in the North Eastern Region are being considered for C.T.C. operation and this scheme when complete will undoubtedly prove to be of great value to British Railways in enabling a more accurate appraisal to be made about the future of C.T.C. projects in this country.

BUSES OF NEW DESIGN for W.A.G.R.

THREE buses, described as the most modern in the Southern Hemisphere are being delivered to the Western Australian Government Railways and incorporate the latest design features: air bag suspension on all wheels ensures perfect riding by maintaining a level deck irrespective of the condition of the road.

A raised deck provides for scenic viewing and at the same time allows ample locker space for luggage, mails, etc., under the seat deck. Aircraft-type sleeper chairs of the design which won the 1960 British Coach Award have been fitted, and both the seats and footrests may be adjusted by the passenger.

Accommodation for 36

The accommodation is for 36 passengers, and a crew of two. Passenger windows are of the aluminium-framed "clipper" type with tinted safety glass, and individual electric lights, each with its own switch are fitted into the luggage rack above the seats.

The buses are well ventilated for summer and heated for winter. The front section of the roof has been set back and used as an air scoop for ventilation. The impacted air is taken by ducts through the hollow fibre-glass internal luggage racks to adjustable air outlets provided above each seat. The deep red or grey carpet is overlaid on half-inch sponge

rubber. Fluted aluminium has been used as the skin of the bus but the frontal panel is of fibre glass. The floor is of reinforced ribbed interlock aluminium.

Each bus is powered by a Leyland 150-h.p. diesel engine. A 50-gal. fuel tank holds sufficient fuel for the Perth-Albany run.

In a buffet compartment, caravan-type fixtures such as cupboards and a plastic sink have been fitted. Three stainless-steel vacuum flasks with spring-loaded taps hold hot water, tea and iced water. Insulated accommodation has been provided for small bottles of soft drinks.

The toilet also has caravan-type fittings including a wash basin and pedestal pan. A lighted panel on the door indicates whether the toilet is engaged or vacant. The cost of each bus is approximately £12,000.

Service particulars

A hostess will serve light refreshments en route and will give service announcements through a transistorised public address system feeding 10 speakers.

Timed to co-ordinate with Perth-Albany train service, new fleet covers 253 miles in 7 hr.

She will attend to passengers' requirements. A "hostess" button has been installed above each seat. Brochures containing service particulars and a description of the route will be distributed to passengers.

Timetable

The buses began running on the Perth-Albany (via Albany Highway) route on Monday, July 31. They cover the 253 miles in 7 hr., including a stop for 20 min. at Kojonup; this is 1½ hr. faster than previously. Leaving Perth each Monday, Wednesday, and Friday at 9 a.m. they arrive at Albany at 4 p.m. They leave Albany on Tuesday, Thursday and Saturday at 9 a.m., and reach Perth at 4 p.m., thus alternating with the express trains in each direction on the other weekdays.

An illustration of one of the buses is included on page 292

CHANGE OF NAME

The Visco Engineering Co. Ltd., incorporated in 1921, has changed its name to Visco Limited.

PERSONAL

U.K.R.A.S

MR. JOHN ALAN BROUGHALL, B.Sc. (ENG.), M.I.E.E., Assistant Chief Electrical Engineer, British Transport Commission, is to visit Brazil to attend a conference on railway electrification at which he will present a paper on British Railways' experience with the industrial frequency system of electric traction. The visit is sponsored by the United Kingdom Railway Advisory Service at the request of the Brazilian Federal Railways. Mr. Broughall was educated at Queen Elizabeth's School, Barnet, and University College, London. After pupilage with English Electric Co. Ltd., he joined that company's Central Design Department. Mr. Broughall entered the service of the L.M.S.R. in 1931 and, in 1935, was appointed Assistant (General & Distribution), being responsible to successive Chief Mechanical & Electrical Engineers at Euston and Derby for power



Mr. J. A. Broughall

supply and distribution. In 1950 he was appointed to the newly formed Electrical Engineering New Works & Development Section of the Railway Executive as Principal Assistant, and, in 1951, was appointed Executive Officer in charge of that section under the direction of the Chief Officer (Electrical Engineering). In 1955 Mr. Broughall was appointed Electrical Engineer (Development), British Transport Commission, later being redesignated Assistant Chief Electrical Engineer. He represents the B.T.C. on several Committees of the Institution of Electrical Engineers and has recently been elected to the Committee of the Supply Section of that Institution, by whom he has been awarded, jointly with Mr. K. J. Cook, the Paris Premium for their paper on the electrification of the Manchester-Sheffield-Wath lines. He also represents the B.T.C. on Committees of the International Union of Railways, and British Standards Institution.

British Railways

MR. G. J. ASTON, Assistant Operating Officer, Euston, British Railways, London Midland Region, who, as recorded in our August 18 issue, has been appointed Movement Superintendent, Line Traffic Managers' Office, Derby, entered railway service at New Brighton. After training at a number of stations and in various departments he was appointed Assistant District Controller at Toton in 1938. He became a Headquarters Inspector (Freight Services)



Mr. G. J. Aston

attached to the Divisional Superintendent of Operations Derby in 1940, Assistant Divisional Controller (Passenger Services) in 1941, and District Controller, Patricroft, in 1943. From June to October, 1944, he was Acting District Controller, Willesden, returned to Derby in October, 1944, as Divisional Controller (Passenger Services) and, in 1948, became District Operating Manager. In 1951, he was appointed District Operating Superintendent at Rotherham, and in 1956, Assistant Divisional Operating Superintendent, Derby. A year later he became Assistant Operating Officer, Euston. Mr. Aston was Vice-Chairman of the East Midland Section of the Institute of Transport, 1950-51. On the opening of the London Midland & Scottish Railway School of Transport in Derby in 1938, he was one of the first 50 students for training.

MR. A. B. ARUNDAL, District Goods Manager, London, Broad Street, British Railways, London Midland Region, who, as recorded in our August 18 issue, has been appointed Commercial Superintendent, Line Traffic Manager's Office, Derby, was educated at Brentwood School, and is a former Exhibitioner of St. Catharines College, Cambridge. During the Second World

War he served in the Royal Navy with the rank of Lieutenant, and was Mentioned in Despatches. He started his railway career as a Traffic Apprentice at Killingworth,



Mr. A. B. Arundale

Northumberland, in 1946, and after the completion of his training in 1948, he was appointed Head of the District Passenger Manager's Development Section, Newcastle. Two years later he transferred to York where he was successively Head of the Combined Excursion & Programme Section in the Commercial and Operating Departments, and Head of the newly-formed Central Timing & Diagramming Office. In 1955 he was appointed Assistant District Commercial Manager, Norwich, and in 1957, Sales & Development Assistant to the Line Traffic Manager (Great Eastern), Liverpool Street. In December, 1960, he was appointed to the position which he now vacates.

MR. J. W. TONGE, Internal Relations Officer, British Railways, London Midland Region, has retired.

MR. L. ELLIOTT, Head of Statistics & Management Accounts Section, Chief Accountants Office, London, British Railways, Eastern Region, has been appointed Traffic Accountant, Sheffield.

MR. J. K. FIRTH, District Goods Manager, Birmingham, British Railways, London Midland Region, who, as recorded in our August 18 issue has been appointed Commercial Superintendent, Line Traffic Manager's Office, Crewe, joined the London Midland & Scottish Railway, as a clerk in the Goods Department, Harrow & Wealdstone in 1935. After experience at a number of goods and passenger stations in the London district, was selected as a Traffic Apprentice

in 1937. His training was interrupted by the war and, from 1940 to 1945, he served in the Forces, mainly in the Middle East. In 1946 he returned to railway service as Acting Goods Agent, Oldham, and, in 1947, was appointed Goods Agent, Willesden. Mr. Firth was appointed Goods Agent at Reading, in 1950, and at Leeds, Hunslet Lane, in 1952. In 1954 he served on the North Eastern Region General Manager's Productivity Committee and, in 1955, became



Mr. J. K. Firth

Assistant District Commercial Superintendent, Hull. Later in the same year he was promoted to be Assistant District Goods Manager, Broad Street, London. Mr. Firth was appointed District Goods Superintendent, Newcastle-on-Tyne in 1957, and two years later became District Goods Manager, Birmingham, London Midland Region.

MR. J. B. CAMPBELL, Assistant to the Works Manager (Carriage & Wagon Repairs), Swindon, British Railways, Western Region, has been appointed Works Manager, Carriage & Wagon Works, Walker Gate, North Eastern Region.

MR. L. C. BALLARD, Wool Agent, Bradford, British Railways, North Eastern Region, has been appointed Assistant to the District Goods Superintendent, West Riding District Leeds. He succeeds MR. W. A. LANGTON, who has retired.

MR. C. P. MILLARD, District Goods Manager, Liverpool, British Railways, London Midland Region, who, as recorded in our August 18 issue, has been appointed Commercial Superintendent, Line Traffic Manager's Office, Manchester, joined the London & North Eastern Railway in 1934 as a probationary clerk. After experience at various stations in the London Area, Mr. Millard was selected, in 1937, as a Traffic Apprentice. He trained at stations, and district and headquarters offices in Scotland, until in January, 1940, he joined Movement Control, Royal Engineers, and later was commissioned. In 1946, after a few months in the District Operating Superintendent's



Mr. C. P. Millard

Office, Norwich, Mr. Millard became Assistant to the District Goods & Passenger Manager, Peterborough, and in 1948 was appointed Goods Agent, Chelmsford. He moved to Portsmouth & Southsea as Goods Agent in 1951, and three years later was appointed Assistant District Commercial Manager, Nottingham-Derby District. He was appointed District Goods Manager, Warrington, in 1956, and moved to Manchester as the Assistant Divisional Traffic Manager, in December, 1957. In January, 1960, he was appointed to the position which he now vacates.

Overseas

MR. L. COTE, Q.C., Assistant General Solicitor, Canadian National Railways, who has been appointed General Counsel, was educated at Laval University and was called to the Quebec Bar in 1931. He joined the C.N.R. at Toronto later in 1931, in the Operating



Mr. L. Cote

Department but transferred to the Law Department in 1932, as Assistant Solicitor, afterwards Solicitor. In 1944 Mr. Cote was appointed Counsel for the Province of Quebec. He was appointed Assistant General Solicitor of the system in 1949.

MR. A. D. McDONALD, Q.C., General Solicitor, Canadian National Railways, who has been appointed General Counsel, graduated



Mr. A. D. McDonald

at Osgoode Hall Law School and joined the C.N.R. in 1927, as a Solicitor at Toronto. He became Assistant Regional Counsel there, and in 1959 was appointed General Solicitor in Montreal.

Industrial

MR. E. J. AARONSON has been appointed General Manager, Overseas Operations, of the General Electric Co. Ltd.

MR. G. F. LAURENCE, Director of Technical Services, Metalistik Limited, has been appointed Deputy Managing Director.

Obituary

We regret to record the death of MR. C. H. GLASSEY, former Chairman of British Industrial Plastics Limited. MR. R. M. BATEMAN, Deputy Chairman of Turner & Newall Limited, has been appointed Chairman of that company.

We regret to record the death of MR. F. BOND, Sales Director of Newton Bros. (Derby), Ltd.

Erratum

SIR PHILIP WARTER, whose appointment as Deputy Chairman of the British Transport Commission was recorded in our August 25 issue, is not now, as stated in that issue, Chairman of Enfield Cables Limited.

NEW EQUIPMENT *and Processes*



CUTTING SEWER-LAYING COSTS

The Taylor-Salem earth borer carries out the excavation which is a prerequisite for underground pipe-laying without disturbing the surface. In a recent application, it simultaneously bored a 14-in. hole and installed a $\frac{3}{4}$ -in. thick steel casing for a distance of 30 ft. under the main London-Norwich railway line, thus enabling the site contractor to join sewers on opposite sides of the line. During the operation, busy rail traffic was unhindered—the entire work, which was accomplished in 5 hr., and subsequent sewer installation left the top surface undisturbed. Speed restrictions were unnecessary. Costs are claimed to have been considerably reduced.

The illustrations on this page show the machine in action. Further details can be obtained from the manufacturer, F. Taylor & Sons (Manchester) Limited, Salford, Lancs.

PEAK REVERSE VOLTAGE *silicon rectifiers*

High-current silicon rectifiers with a peak reverse voltage rating up to 1,000V are available in seven models. They can be obtained in forward or reverse polarity. The 1,000V. unit, with a transient voltage rating of 1,300, offers the opportunity to use one cell across a 440V. line rather than two or more cells with the consequential economies in assembly, circuit protection, and system efficiency.

The rectifier can be used to replace existing lower-voltage silicon-rectifier cells in the 50-100A. range. The hard-

solder construction of the units makes them resistant to thermal fatigue and enables them to perform reliably in applications where large temperature excursions are encountered. These rectifiers have been assigned JEDEC designations IN3289 through IN3295 and differ by p.r.v. ratings which range from 200V. to 1,000V.

The IN3293 type in the 600V. range is being used successfully in the silicon rectifier multiple-car unit on the New

Haven Railroad. These devices convert the alternating current from the trolley to the direct current required to drive the vehicle.

Further details can be obtained from the manufacturer, International General Electric of New York Limited, 296, High Holborn, London, W.C.1.

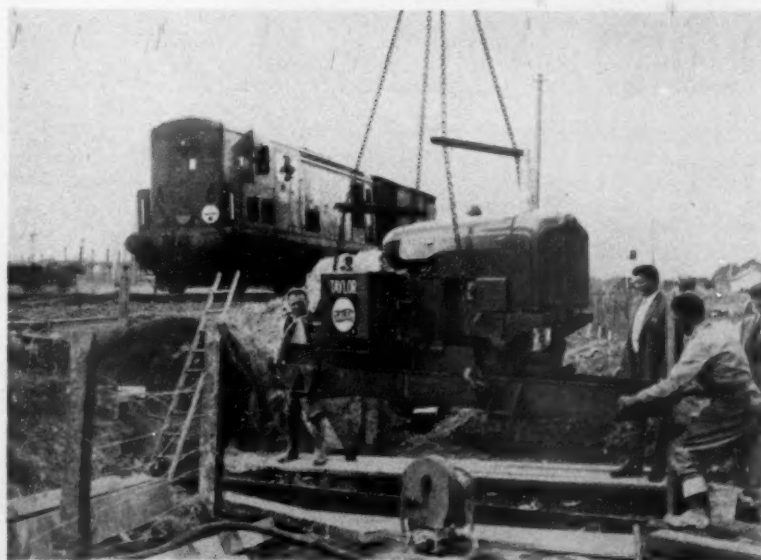
ADHESION LOSS DETECTION *and correction*

The Adhesion Loss Detection & Correction system has been developed to lengthen traction motor life and to effect an increase in gross ton-miles per train-hr. It automatically detects and corrects wheel-slip at all locomotive speeds. Wheel-slip is corrected for each locomotive unit individually; corrective action is applied only to the locomotive unit experiencing wheel-slip.

Further details can be obtained from General Electric, Erie, Pa., U.S.A.

ELECTRONIC WEIGHER

Developed from systems already installed in railway hump yards and iron and coal mines, an electronic weighing-in-motion system has been installed at a steel mill now under construction near Detroit, U.S.A. The weigher will record the weights of railway wagons as they enter the mill with raw materials and again as they leave with finished products, all without interrupting production flow. Weights of uncoupled wagons are printed-out and fed into an adding machine as



they move over a railway track scale. The whole operation takes only 3 sec. for each wagon. Loads of up to 330,000 lb. can be weighed.

Further details can be obtained from the manufacturer, the Fairbanks Whitney Corporation, 745, Fifth Avenue, New York 22, New York, U.S.A.

PICK-A-BACK DEVELOPMENT

Illustrated on this page, the Portager system was designed to meet a transport concept outlined by the Canadian Pacific Railway and Smith Transport Limited. What was required was a systems approach to a rail vehicle carrying a side-loaded highway trailer body weighing up to 30 tons. Costs had to show significant savings over existing equipment, and maintenance minimised. The rail vehicle

the loaded wagon is impacted severely. At one end, a standard highway tractor fifth wheel hitch-locks on the trailer-body kingpin. A double-acting arrestor gear of 48,000 ft. lb. capacity permits the container to move back and forth 10 in. each way of centre and protects both container and load from railway handling impacts. At the other end, a rear guide-frame positions and supports the container in exactly the same way as does the tandem when the unit is on the highway. It also permits the container to slide back and forth under impact conditions.

Any side-loading device now in existence can be used, and the way is open for even more efficient machinery, for clearance is provided over and under the centre sill and no deck is present. This allows maximum latitude for the development of lifting equipment of high prod-

the manufacturer, General Motors Diesel Limited, London, Ontario, U.S.A.

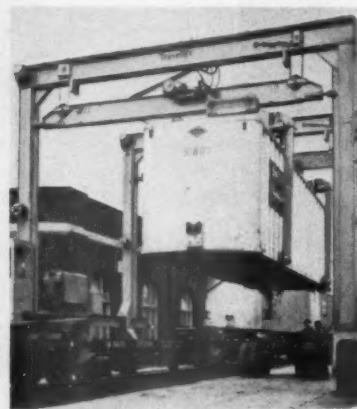
INERTIA GEAR ANALYSER

A rolling fixture type of gear analyser using inertia principles and electric indicators to provide three simultaneous precision measurements of gear-tooth accuracy has been developed and will be marketed in the United Kingdom. It can detect nicks on tooth profiles as small as 0.0005-in. high.

Further details can be obtained from Precision Gear Machines & Tools Limited, Bodmin Road, Wyken, Coventry.

ELECTRIC WELDING of mild steel

The MRSX.150 slope-controlled rectifier permits semi-automatic electric



had to be compatible with existing railway equipment in that it had to run in the same train at high speeds. It had to provide ride qualities for the container and loading of the same order as those experienced in normal highway service, and transmittal of rail handling impacts must be such that no damage would occur. No changes might be made to the trailers or containers in making them suitable for loading on the rail vehicle that would significantly increase the expense of the wagon side of the system.

The Portager system is claimed to meet all the above criteria. Each axle with its fully-flexible carrier suspension supports an end of the container, a single centre-sill taking the pull and buff as well as being strong enough not to bend when

activity. Loading and unloading can face each way, be from each side, and in any order. It can be carried out in 2 min. by two men.

When a trailer body has been loaded, the rubber-tyre rear tandems are left at the terminal, a factor claimed to be of advantage to the motor carrier side of the system.

The absence of tandem contributes to rail economy, because a sizeable proportion of deadweight is thereby eliminated. The height is brought within all railway system clearances and train windage losses are reduced. Less horsepower is needed to pull the train because of the lower resistance and tare weight of 29,000 lb.

Further details can be obtained from

welding of mild steel over a wide range of thicknesses down to 20 s.w.g. in any position and even with excessive gaps. The slope control is designed to control a volt/ampere curve enabling the operator to select any characteristic between constant potential and steeply drooping to suit any welding position. A closely-controlled arc gives a pin-point heat source. The equipment is cheaper to operate than the previous method of gas-welding under similar conditions. Welding speeds are higher—with no distortion.

Further details can be obtained from the British Oxygen Co. Ltd., Bridgewater House, St. James's, London, S.W.1.

MAGNETIC WELDING FLUX Separator

The Armco magnetic separator provides a method of removing particles of mill scale picked up during reclamation of unused flux during submerged arc-welding operations. It is similar to a strainer, except that it catches magnetic instead of oversize materials.

The top of the equipment comprises a cylindrical hopper 10 in. in dia. x 3 in.



deep. Slots in the bottom permit granular flux to flow through the hopper. Immediately below the slots, cylindrical magnets are free to revolve as the flux flows over them. A hinged and slotted cover fits under the magnets, retarding flux flow to a suitable rate.

Flux is poured into the hopper. The separator then traps any magnetic materials in the flux which flows through it. The magnets attract the material and hold it so that only non-magnetic flux passes through. When the magnets have picked up their full capacity of magnetic particles, flow ceases.

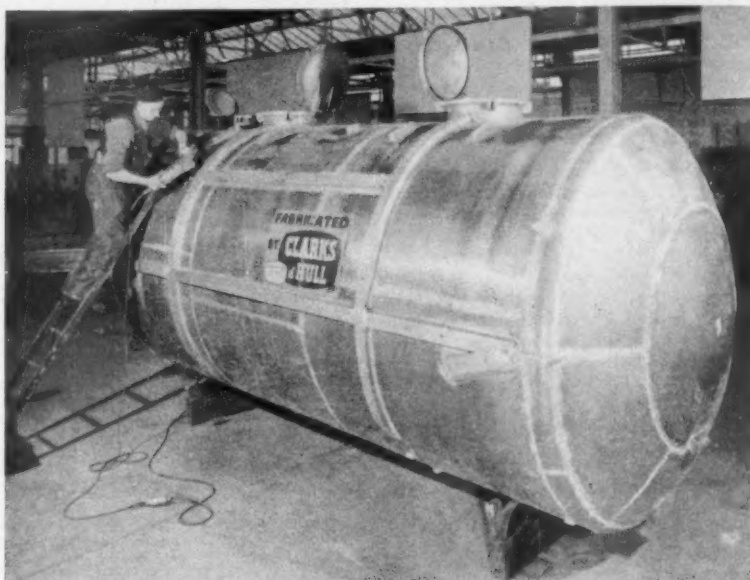
The separator is suitable for any mild steel submerged-arc flux and some hard-surfacing fluxes.

Further details can be obtained from Armco Limited, 76, Grosvenor Street, London, W.1.

DEXION FOR CONVEYORS

Two kinds of Dexion conveyor systems are being used to speed up the overhaul of vacuum-brake cylinders at British Railways Carriage & Wagon Works at Walkergate. Built by railway staff, the installation comprises a Dexion glide-wheel conveyor manufactured to fit

exactly inside the vacuum-cylinder repair shop. Heavy vacuum-brake cylinders are borne on special sling-supporting frameworks mounted on plywood bases. These are easily moved along the glide-



wheel conveyor from one work position to another. A drawbridge-type conveyor using Dexion rollers allows the units to be moved across to the central work benches.

Further applications of Dexion can be discussed with the Dexion Group, Maygrove Road, London, N.W.6.

BULK TRANSPORT OF FLOUR

Now under trial by British Railways is a 7-ft. dia. x 16-ft. long magnesium

alloy tank, part of a new idea of British Railways for quick road/rail bulk transport of flour.

The tank is fitted to a special transportable cradle designed for quick trans-

fer by overhead crane from road to rail vehicle. Loading and unloading of the flour is by compressed air and the tank must withstand a test pressure of 30 lb. per sq. in.

The tank and its system of discharge are suitable for other applications. The contractor, the Duramin Engineering Co. Ltd., is working on a project for carrying a payload of 15 tons of cement powder, using the same principle but with the tank mounted permanently on a commercial road-vehicle chassis.

Further details can be obtained from the manufacturer, George Clark & Sons (Hull) Limited, Hawthorn Avenue, Hull.

BONDING MATERIAL

Expandabond is a p.v.a. emulsion supplied ready for use and is suitable for the bonding of any common materials to themselves and to each other except p.v.c. and rubber. It is claimed to be ideal for bonding new concrete to old surfaces without hacking or keying, and for securing cement and plaster screeds. It can be used as a sealer and for making a plastic screed for floors which will resist wear. Fillers can be added where gap-filling properties are required. It is waterproof, petrol- and oil-resistant, and will not crack, craze, or become brittle with age. It is available in white only.

Further details can be obtained from the manufacturer, Expandite Adhesives Limited, Birchley Street, St. Helens, Lancashire.



Accommodation at Western Region locomotive depots

Accommodation dating back to the early years of this century has been replaced at the British Railways, Western Region locomotive depot at Tyseley. The entire structural concrete frame was manufactured away from the site and then assembled on site with the minimum use of wet materials. The external walls and internal partitions have been designed for sound and heat insulation.

The office block accommodates not only clerical and supervisory staff, but also has a large drivers' lobby where instructions and notices to the staff are displayed. Here the footplate men book on and off and receive their instructions. The office furniture was designed by Mr. R. L. Moorcroft, Architect, Western Region of British Railways, and made in the British Railways workshops at Swindon.

Incorporated in the amenities portion of the building are a wash room, and lockering and clothes-drying facilities for the 650 men who include drivers, firemen, and maintenance and repair staff for steam locomotives and diesel multiple-unit sets.

On the first floor is a messroom which seats 100. This has an instantaneous water boiler, and four small electric cookers for the men to cook their own food.

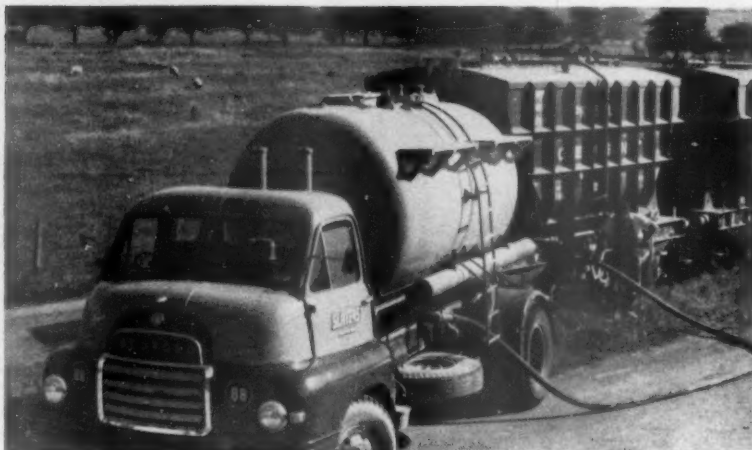
A new 750-kV. sub-station is incorporated in the building which will serve the whole depot. The main contractor was Smith Bros. (Construction) Co. Ltd., Birmingham.

The facilities at Stourbridge locomotive depot consist of a new building containing messrooms, wash room, locker room, cloak-room and lavatory, and an existing building converted to accommodate offices, lavatories, enginemens' duty room and classroom.

The building stands on a 6-in. reinforced-concrete raft. The outer walls consist of cavity brickwork faced with grey Flint Lime bricks with partitions of common bricks plastered, and in certain rooms tiled, to door height.



Offices and staff amenities at Tyseley Locomotive Depot



Pneumatic discharge of cement from "Presflo" wagon to Slater pressurised road vehicle at Thornton Dale

All internal finishes of the building have been chosen for resistance to the hard wear which this type of building undergoes throughout the year. The possibility of both steam and diesel engines being serviced has been borne in mind and floor finishes have been designed which will survive the abrasive and chemical effect of coal dust and eroding effect of various oils.

The whole of the building was designed and constructed to conform to a 40 in. x 40 in. planning grid to simplify the task of preparing working plans and setting out the building on the site. The main contractor was Wilson Lovatt & Son Ltd.

Transport of cement to Fylingdales

The 20,000 tons of cement needed for the foundations of the early warning radar station at Fylingdales Moor, are being carried by the North Eastern Region of

British Railways in Presflo-type wagons which have been specially developed to carry finely powdered commodities like cement, in bulk.

Each wagon carries 20 tons and is filled by gravity through its two roof hatches. It is discharged by means of compressed air, the cement being blown through a four-inch pipe, either direct into the receivers' storage silo or into a pressurised road vehicle for final delivery to the consumer.

In moving this vast quantity of cement to the Fylingdales site, which is eleven miles from the nearest railway station, a combined rail and road transport service is being given. Ten Presflo wagons are continuously running between the producing works at Melton, near Ferriby, and Thornton Dale Station, near Pickering. There the cement is pneumatically discharged into the pressurised road tankers of Slaters Transport Limited. From these vehicles it is again 'blown' direct into the storage silos on the site, giving a throughout transport service—producer to consumer—untouched by hand.

Prototypes of the Presflo wagon were built at British Railways, North Eastern Region's Wagon Works at Shildon, and they are now successfully moving several thousands of tons of cement every month to depots in Leeds, Bedale, Osbaldwick, Scunthorpe, and Garston.

Power signalbox for Edge Hill

The London Midland Region of British Railways brought a power signalbox into operation at Edge Hill, Liverpool, on August 28.

The completion of this installation marked the removal of the last remaining main-line semaphore signals between Crewe and Liverpool and paved the way for the introduction next year of electrified services between the two towns. With the colour-light signalling already installed between Crewe and Manchester there is now a total of 84 miles of continuous colour-light signalling extending northward from Crewe.

The box has three identically-equipped 48-line telephone keyboards on the Regulator's desk in the Operating Room. From these, circuits radiate to stations

and other signalboxes in the area and to traffic and electric control rooms at Crewe and Liverpool.

Also linked to the box are 80 colour-light signals, 30 position-light ground signals, 192 track circuits, and 85 pairs of electro-pneumatically operated points. A master clock in the box controls electric impulse clocks at other signalboxes, stations and depots in the area.

B.R.S. parcels developments

Widespread modernisation and extensions have just been completed to British Road Services parcels depots at Cambridge Grove, Hove, and Melbourne Street, Bedford.

The depot at Hove was once the old Hove Carter Paterson yard and will serve an area from Bognor Regis to Seaford and inland as far as Petworth, Billingshurst, Cuckfield, Haywards Heath and Mayfield. The extension provides an additional 4,500 sq. ft. of platform and this nearly doubles the space previously available.

British Road Services has taken further steps to improve services in this area by the development of direct scheduled services to the Midlands, rather than passing through London depots. There has been a speeding-up of services to other parcels depots in Kent and Sussex and along the south coast to Portsmouth, Southampton and Bournemouth, as well as the introduction of a direct service to the Central London shipping depot to cater for docks traffic. All parcels for trunk services to other parts of the country will be forwarded on the same day they are received in Hove.

A 1,500-sq. ft. warehouse, a service station and an office block have been built at the Hove depot, which is one of ten operational depots in the Southern Area of B.R.S. (Parcels) Limited.

B.R.S. has also doubled its platform area at its Bedford depot, of the Northants parcels branch, which serves the area bounded by St. Neots, Gamlingay, Biggleswade, Baldock, Stevenage, Hitchin and Ampthill.

CONTRACTS & TENDERS

£2 million locomotive order placed

Rhodesia Railways has placed an order worth over £2,500,000 for diesel-electric locomotives with the English Electric Co. Ltd. and Brush Electrical Engineering Co. Ltd.

Contracts worth £214,000 have been awarded to Associated Electrical Industries Limited, by the British Transport Commission. One of these contracts, worth £113,000, is in connection with railway electrification renewal work in London for British Railways London Midland Region. The work will be carried out by AEI Construction (Cables and Lines) Division between Kilburn and Camden and between

Camden and Broad Street. It includes the supply and installation of 36,000 yd. of 11 kV. three-core solid type cable plus certain quantities of lower voltage and telephone cable, the construction of the cable route, and the dismantling and recovery of old cables and route materials.

A cabling contract worth £101,000 is associated with power supplies for signalling on London suburban electric railway lines from Charing Cross, Victoria and Cannon Street stations. The work will be carried out for British Railways Southern Region by AEI Construction (Cables and Lines) Division. 20 miles of track are involved, and the contract will include supply and installation of approximately 40,000 yd. of 3.3 kV. and lower voltage corrugated aluminium sheathed cables, and approximately 24,000 yd of pilot supervisory cable, plus associated route work.

The Netherlands Railways has placed an order for power and running units for installation in Dutch-built buses to the value of £200,000 with Leyland Motors Limited. The Ceylon Government Railway has ordered two Scammell 3-ton 4½-cu. yd. end-tipping semi-trailers from the same company.

The Queensland Government has placed an order with the Commonwealth Engineering (Qld.) Pty., Ltd. for 400 wagons at a total cost of £A.789,166. They will carry ore from Mt. Isa when the Townsville-Mt. Isa railway construction has been completed. The English Electric Company, at its Rocklea Works near Brisbane, is engaged in the building of diesel locomotives for use on this section of the Queensland Railways.

British Railways, North Eastern Region, has placed the following contracts:—

H. W. Ward & Co. Ltd.: provision of a capstan lathe and accessories for the York Apprentice Training School

T. S. Harrison & Sons, Ltd.: provision of four centre lathes for the York Apprentice Training School

Permutit Co. Ltd.: provision of a water softening plant for diesel main-line locomotives at York motive power depot

Woolman, Limited: installation of electric lighting in the new control tower in the Up marshalling yard at Newport

Clayton and Chambers, Limited: provision of a steam generator and water softening equipment to provide steam heating for sleeping cars at Darlington Bank Top Station

Tecalemit Limited: provision and installation of a loading hoist at Bradford Valley Goods Station

Yale & Towne Manufacturing Co. Ltd.: provision of a fork lift truck for use at Goole docks

Petbow Limited: renewal of a diesel alternator in the Northallerton signalbox power house

Vallance Electrical Engineers Limited: installation of electric lighting to replace the existing gas lighting at Sowerby Bridge Passenger Station

A. Reyrolle & Co. Ltd.: provision of two transformer panels to be installed in the Collier Street sub-station, Hull, required in connection with the construction

of the new Traffic Manager's offices at Hull Paragon Station

Wilkinson (London) Limited: provision of a Wadkin pattern milling machine for the locomotive carriage & wagon development unit at Stoopdale, Darlington

K. S. Construction Co. Ltd.: installation of electricity in the new office block at Holbeck, Leeds motive power depot. Also for electrical distribution works for the depot yard refuelling point

Intermit Limited: provision of filter cleaning equipment for the maintenance of diesel locomotives at Hull, Dairycoates, motive power depot.

Under the 1957 Financial and Technical Assistance Agreement between the U.S.S.R. and Syria, a railway is to be constructed from the Mediterranean port Latakia to Qamishieh, a place at present unidentified, at an estimated cost of £Syr.350 million. It is expected that tenders will be invited shortly for the supply of 1,500,000 concrete sleepers and 18,000 concrete telephone posts.

The Natal Tanning Extract Company Limited, of Pietermaritzburg, an associate of J. Pittam & Co. Ltd., has just been given the annual contract for supplying the South African Railways with the bulk of their needs for Water Treatment Chemicals. The annual value of this contract is approximately £90,000.

A tender for 55 diesel locomotives, metre gauge, fully erected and complete to accord with general specifications and drawings supplied by the Burma Railways has been announced.

The issuing authority is the Office of the Chairman, Union of Burma Railway Board, Bogyoke Aung San Street, Rangoon, from which specifications, drawings, and conditions may be obtained, price 70 kyats a set. The closing date is November 2.

The Export Services Branch, Board of Trade, has received calls for tenders as follows:—

From South Africa:

Supply and delivery of heavy ballast tampers and subsequent operation and maintenance by contract.

The issuing authority is the Stores Department, South African Railways, to which bids should be sent. The tender No. is F.8825. The closing date is September 15, 1961. The Board of Trade reference is E.S.B./26186/61.

From Thailand:

1 diesel engine generator set 175-200 kW. with accessories

1 electric motor-driven air compressor capacity 270-300 c.f.m. free air at 100 p.s.i. with accessories.

The issuing authority is the State Railways of Thailand, Yod Se, Bangkok, to which bids should be sent. The closing date is October 3. The tender No. is 04261. The Board of Trade reference is E.S.B./27994/61.

From India:

3 diesel-electric locomotives.

The issuing authority is the Controller of Stores & Purchase, Rourkela Steel Plant, 7 Wellesley Place, Calcutta 1. Tender documents may be purchased from the Assistant Administrative Officer (Purchase), Rourkela

Steel Plant, price Rs.100. The closing date is October 27. The tender No. is P/E3/9301. The Board of Trade reference is E.S.B./28245/61.

From Greece:

31,576 kg/m. French-type rails for 300 kms. of single track, approx. 19,000 tons
40,000 fish plates for above rail, approx 270 tons
160,000 track bolts, approx. 90 tons
400,000 track plates, approx. 820 tons
500,000 sleeper screws, approx. 200 tons
Special rail anchors for above track.

The issuing authority is the Ministry of Trade. Bids should be sent to the Offices of the Direction B State Purchases, 50 Socratous Street, 4th Floor, Athens. The closing date is October 10. The Board of Trade reference is E.S.B./27620/61.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Laccon House, Theobald's Road, W.C.1).

NOTES AND NEWS

Bus-about tickets success. During the month of August, London Transport Executive issued 150,000 bus-about tickets. 90,000 adult tickets at 5s. and 60,000 children's tickets at 2s. 6d.

Another Spanish derailment. Another derailment near Santander, the second in the province in a fortnight, has resulted in two people being killed and 30 injured. The engine of a local train from Torrelavega to Santander left the rails about five miles from Santander and pulled a goods van and the first two passenger coaches with it. An official inquiry is being held.

Prize-winning station. Stow Bedon Station Norfolk, Eastern Region, British Railways, with a staff of only two, has won a first prize in the Region's Best Kept Gardens Competition for the fourth successive year.

Special trains to Blackpool and Morecambe illuminations. The North Eastern Region of British Railways is to run 64 special trains to Blackpool and Morecambe between September 8 and October 29, the period of the illuminations at these two centres. Most of the trains will run on Saturdays and Sundays for whole-day or half-day excursions.

Bus stop guides. The London Transport Executive is to display a simple map at Croydon bus stops, from September 15, showing the location of bus stops in the area. Reference letters and numbers on the map will correspond to the letters and numbers displayed on red discs on the top of bus stop posts.

Bus depot at Darlington. The United Automobile Services Limited has opened a bus depot at Darlington. All bus services running into and out of the Borough will use the depot, not only those of the United Automobile Services Limited and its associate Durham District Services Limited but also those of local independent operators.

British Railways North Eastern Region Swimming Championships. The 1961 Swimming & Diving Championships of the British Railways Staff Association, North Eastern Region, were held in the Gladstone Baths, Darlington on September 2. Nearly 70 competitors from all parts of the Region took part in the various events. Immediately following the completion of each final, awards were presented by Mrs. K. A. Kinson, wife of the Traffic Manager (Teesside), North Eastern Region, Middlesbrough.

Tube coach for Science Museum. A 32-year old London Transport Executive tube coach is to be installed in the transport gallery to be opened in two years time at the Science Museum at South Kensington. The illustration shows car No. 3327 outside

the gallery after being transported from Acton Works on September 3.

Rail car loadings. American Railroad Association statistics show that loadings of revenue freight for the week ended August 12 totalled 591,062 cars. This represents a decrease of 8,959 from the number loaded in the corresponding week last year. Loadings of grain freight in the same period amounted to 63,326 cars—an increase of 3,902.

Fatal rail accident in France. Eight passengers were killed and 32 were injured on August 29, when 10 coaches of a train from Roscoff to Paris left the rails as the result of a collision with a locomotive at le Theil station, near la Ferté-Bernard. All traffic from Nantes and Rennes had to be re-routed.

Pennsylvania rail strike injunction. In Philadelphia a U.S. District Court judge has issued an injunction preventing the Transport Workers Union from striking against the Pennsylvania Railroad. The strike had been threatened for midnight of August 31.

Railway to be converted to road. A length of abandoned railway line is to be used for a new "fly-under" junction as part of the modernisation of a further mile and a half of the Great North Road (A.1) in Huntingdonshire. The new road, which is expected to be open to traffic by autumn next year, will follow the general line of the present route.

Fire under track. Cement has been used in an attempt to extinguish an underground fire under a two-mile section of the main London-Scotland line at Hasland, near Chesterfield, British Railways, London Midland Region. The fire is believed to be caused by low-grade coal buried when the tracks were laid. If it is not extinguished by the cement, bulldozers will be used to dig down to the seat of the fire.

Child burned by live rail. Last week a small boy who had been train-spotting at Putney, British Railways, Southern Region, touched the conductor rail and lay unconscious on the path of an approaching train. The driver was unable to brake in time, and the train passed over the child, who was later taken to hospital with severe burns.

Course on corrosion & protection of metals. Last session, a one-year course in "Corrosion & Protection of Metals," designed to enable students to approach corrosion problems with an adequate knowledge of the scientific principles involved, was introduced at the Borough Polytechnic, London, S.E.1, and it has been decided to offer this course again in the forthcoming session. The course can be taken either as a part-time day (one afternoon and one evening) or as an evening course (two evenings a week), and at the end of it students will be able to sit for the Borough Polytechnic "Corrosion Engineering Certificate" examination. Enrolment for this and other courses can be effected by personal attendance on September 18 or 19, morning and evening.

Wagon Repairs Limited. Mr. E. Duncan Taylor, Chairman of Wagon Repairs Limited, in the directors' report, stated that current revenue was showing an upward trend.



London Transport Executive tube coach for the Science Museum at South Kensington

The repair and overhaul of privately-owned vehicles and rail tank cars was being well maintained, and the company's own manufactures and foundries were contributing to the satisfactory results.

Lloyd Instruments Limited change of address. Lloyd Instruments Limited has announced its acquisition of new premises at Furrow Lane, Homerton High Street, London, E.9, Tel.: AMH 6578. The subsidiary company of H. Millington Limited, will also be moving to the same address. The removal will be effected by September 15.

C.N.R. results for June 1961. Operating revenue of the Canadian National Railways was \$58,466,000, expenses, taxes, and rents were \$68,415,000, making a net operating deficiency of \$9,949,000. In June last year there was a net operating surplus of \$132,000. The figures given do not include any provision for fixed charges but include \$7.6 million for retrospective wages increases granted in May, 1961.

Withdrawal of passenger train service. The Western Region of British Railways is to withdraw the passenger train service between Andoversford Junction (Glos.) and Andover Junction (Hants) on September 11. Andoversford Junction, Savernake, and Andover Junction, will continue to be served by trains on other routes. Cricklade, Marlborough, and Ludgershall will remain open for handling parcels traffic, and all other stations and halts on the line will be closed.

I.R.A. blows up holiday train. A diesel engine was blown up on September 3 by I.R.A. men who raided a holiday excursion train returning to Dublin. The raiders signalled the train to stop with lamps. Then they boarded the engine and ordered the crew out. The driver was forced at gunpoint to help disconnect the engine and take it closer to the border. Then he was told to "clear off." As he made his way back to his stranded passengers he heard an explosion. The 100 passengers were delayed for several hours before a relief train could be organised. The blast also damaged the main line between Belfast and Dublin.

Special tickets for Farnborough display. Special cheap tickets from many railway stations are being issued by the Southern Region of British Railways for the Farnborough Air Display on September 8-10. The tickets will be available at most Southern Region stations between Broadstairs on the East Kent coast and the Exeter-Exmouth line in Devon. Tickets from the South-Eastern Counties will also cover the bus journey from Aldershot or North Camp stations to the airfield in buses run by the Aldershot & District Traction Co. Ltd. Passengers travelling from the west will use Farnborough station. In addition to the normal services, a number of "specials" will run from Waterloo to Aldershot on each day of the flying display and exhibition.

Passenger returns lost purse. A purse, found by a passenger on August 16, who refused to hand it to the Lost Property Office of British Railways, has been returned by the finder to its owner. Mr. Blount, who found the purse, disputed the legality of the British Railways regulation which says things found

on railway property belong to the railways if the owner does not claim them within three months. The matter had been referred to the British Transport Commission's solicitor.

Ghana railway strike. Several hundred employees of Ghana Railways have struck at Takoradi in protest against a compulsory savings scheme introduced last July to help balance the country's budget.

Stolen painting on train. A man who told fellow passengers that the package which he was carrying contained the missing Goya painting travelled on a Plymouth-Bristol train on September 3. The police were called at Bristol but no trace of the passenger could be found.

Results of modernisation in New South Wales. Mr. F. P. Buckley, Agent General for New South Wales, said on September 4, that the Railway Department in his State had expended £A150 million since 1945 in modernisation schemes to bring the railway system to its present high level of service, £A36 million had been spent on rolling stock. The railways had made a surplus for the year 1960/61 of £A25,246 as a result of record revenues and freight carryings, and despite increases in salaries and wages, increased superannuation contributions and a payroll tax.

Alterations to Eastern Region timetable. The Eastern Region of British Railways has announced alterations to the Tilbury-Gravesend ferry service published in its winter timetable coming into operation on September 11. The ferry service is to be intensified on weekdays to give a 15 min. departure in each direction from 10.30 a.m. to 12 noon. The 12.30 p.m. sailing from Tilbury and the 12.45 p.m. from Gravesend will operate each weekday instead of Saturdays only as published.

Point-heater experiment. British Railways is carrying out an experiment with point heaters using propane gas. The North Eastern Region has 586 heaters installed in the York, Darlington, and Newcastle areas. The Southern Region has 30 at strategic points which include Coulsdon, Strood, Rainham, Alton, and Fratton. The equipment has been installed at Shenfield, on the Liverpool Street line of the Eastern Region and at Penistone between Sheffield and Manchester for some time but it has not yet been tested by severe frosts.

London-Bristol line blocked. Both tracks of the London-Bristol line of the Western Region of British Railways were blocked between Swindon and Chippenham on September 5. A goods train broke in two near Wootton Bassett, Wiltshire, and some of the runaway wagons became derailed.

Rush-hour trains delayed. Train services into Holborn and Blackfriars Stations on the Southern Region of British Railways were delayed by a derailment on September 5. The 4.43 p.m. Bickley to Holborn Viaduct train was derailed a mile from Blackfriars Station and three coaches blocked four lines. No one was injured but shaken passengers were helped on to the track and escorted to Blackfriars. Engineers worked throughout

the night but only two of the four tracks were clear for the rush-hour traffic the following morning.

Warerite price reduction. Bakelite Limited has reduced the price of certain designs in Warerite veneers. The list price is now 3s. 2d. a sq. ft. instead of 4s.

Reconstruction of Arctic line. To increase its capacity, the Riksgransen line of the Swedish State Railways—crossing the Arctic Circle and connecting with the Norwegian line to Narvik—is being reconstructed. Traffic over it is mainly iron ore from the Kiruna fields to Narvik for shipment. The reconstruction will enable the existing maximum axleload of 18 tons to be increased to 25 tons and the load of each ore train to be increased by 50 per cent. The work, which includes the rebuilding of some 60 bridges, can be carried out only during the short Arctic summer. The largest bridge rebuilt this summer is at Katterjakke, near the Norwegian frontier, the replacement having been completed in an 8-hr. line-occupation. The whole work of reconstruction is scheduled for completion in 1964.

Chicago Union Station to be built over. The Diesel Construction Company of New York and City Centre Properties Limited, of London are combining to build over Chicago Union Station in the same way as this is being done at New York Grand Central terminal. At Chicago, 330,211 sq. ft. of air rights are available. This was recently announced by the President of the Chicago Union Station Corporation and the Chairman of the Diesel Construction Company. The buildings are to be supported on caissons between the station tracks to avoid interference with traffic. Three multi-storey office blocks and possibly a hotel and car park are suggested. The estimated cost is about £70 million and work is to begin before the end of the year.

Revised British Standard. The British Standards Institution has revised and enlarged B.S.1123, giving specifications for safety valves, gauges, and other safety fittings for air receivers and compressed air installations. The main provisions of the Standard remain unchanged but modifications have been made to secure co-ordination with the 1955 edition of revised B.S.759—"Valves, gauges, and other safety fittings for application to land boilers and piping installations for and in connection with land boilers."

1938 British Standard revised. Revision of the 1938 edn. of B.S.158 has simplified the future marking and arrangement of switchgear busbars main connections and small wiring. The colours now prescribed do not involve stripes, and white is no longer included as an alternative to yellow for polyphase markings. Colours for main connections and small wiring have been brought closely into line and the roles played by green and black are different in the new edition. An appendix to the revised specifications gives guidance on the marking of small wiring and includes reference to one system of functional marking. Copies of this Standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1, price 5s. each.

BUSES FOR WESTERN AUSTRALIAN GOVERNMENT RAILWAYS—(see page 282)



Bus for the Road Services of the Western Australian Government Railways

Railway Stock Market

Antofagasta ordinary stock was one of the more active stocks but at 21, compared with 22 a week ago, and now yields nearly 15 per cent on the basis of last year's higher dividend of 3 per cent. Moreover, the 5 per cent preference stock at 35 also yields over 14 per cent. The high yields, of course, indicate the speculative element involved, but there are hopes that the 3 per cent dividend on the ordinary stock may be maintained. This stock has had extreme prices this year of 15 and 23½, and those for the preference stock have been 31½ and 37½.

United of Havana second income stock at 7 is half a point below its best for the year; the consolidated stock has again changed hands around 1½. Mexican Central "A" bearer debentures lost a point at 58 and elsewhere, San Paulo Railway 3s. units were again around 2s. 3d. Costa Rica ordinary stock was maintained at 38½ with the first debentures at 93½ and the second debentures 125. Guayaquil & Quito assented bonds were 58½ and Paraguay Central prior debenture 18. Brazil Railway bonds were 4.

International of Central America common shares were \$14½ and the preferred stock was marked down to \$8½.

Canadian Pacifics at \$44½ compared with \$42½ a week ago, the preference stock 55½ compared with 55½ and the 4 per cent debentures 53½ compared with 52½. White Pass shares were \$11.

In other directions, Nyasaland Railways shares were better at 11s. 6d., and the 3½ per cent debentures 32. Midland Railway of Western Australia ordinary stock was again quoted at 11 and the £1 units of second debentures at 11s. West of India Portuguese capital stock was quoted a point higher at 119½.

Among shares of locomotive builders,

engineers and allied companies, Beyer Peacock 5s. shares were 6s. 9d. at which there is a yield of over 8½ per cent on the basis of last year's 12 per cent dividend, Charles Roberts 5s. shares were higher at 5s. 10½d. Westinghouse Brake shares also eased with the general trend of markets and at 32s. 6d. were at their lowest of the year, giving a yield of over 6½ per cent, last year's dividend having been 11 per cent. Wagon Repairs 5s. shares were 22s. and Gloucester Wagon 10s. shares 9s. Birmingham Wagon rose sharply to 27s. North British Locomotive were 5s. 6d., and G. D. Peters again quoted at 18s. 9d. Vague talk has persisted in the market of the prospect of mergers or working agreements between locomotive building and kindred companies, but there is no news of any definite developments on these lines. It is thought, however, in the City that more companies will widen and diversify their activities.

Stone-Platt eased to 58s. 6d. at which there is a yield of nearly 6 per cent on last year's 16 per cent dividend. Elsewhere, Babcock & Wilcox rallied from 25s. 7½d. to 26s. 4½d. Guest Keen were slightly higher on balance at 89s. 9d. and Vickers have again changed hands around 33s. In other directions, Ruston & Hornsby rallied from 22s. 9d. to 23s. 6d. Pressed Steel 5s. shares have been firmer at 20s. 4½d. and also Dowty Group 5s. shares at 32s. 7½d. Leyland Motors rallied to 91s. 6d. because of general confidence that the year's dividend will be maintained at 20 per cent. Pollard Bearing 4s. shares dropped 1s. 4d. to 33s. despite the 5 per cent interim dividend maintained on larger capital and the news of higher profits for the half year: new shares are offered at 22s. 6d. each, one for every ten held, and it is hoped to pay a final dividend of 15 per cent on the capital as increased by this rights issue. Elsewhere, Ransome & Marles 5s. shares were firm at 15s. 6d.

Forthcoming Meetings

- Sept. 8 (Fri.). The Railway Club. Talk, The Skye Line, by H. A. Vallance, 320, High Holborn, London, W.C.1.
- Sept. 9 (Sat.). The Railway Correspondence and Travel Society. Denton-Harlaston rail tour.
- Sept. 10 (Sun.). The Railway Correspondence and Travel Society. Midland & South Western Junction Railway tour.
- Sept. 16 (Sat.). The Permanent Way Institution, East Anglia Section, visit to Permali Limited, Gloucester.
- Sept. 16 (Sat.). The South Bedfordshire Locomotive Club, special train over the freight-only, Welwyn Garden City to Hertford branch.
- Sept. 16 (Sat.). Railway Students Association, annual outing from Reading South Station.
- Sept. 18 (Mon.). The Historical Model Railway Society. Talk, The Construction of Freight Rolling Stock, at Keen House, Calshot Street, N.1.
- Sept. 23 (Sat.). The Railway Correspondence and Travel Society. The four-counties rail tour.
- Sept. 25 (Mon.). Institution of Railway Signal Engineers, Bristol. Signalling developments on the Railways of Southern Africa.
- Sept. 26 (Tue.). The Institution of Locomotive Engineers. Ordinary general meeting and Presidential address. 5.30 p.m. 1, Birdcage Walk, S.W.1.
- Sept. 27 (Wed.). Annual dinner of the East Indian Railway Officers. Connaught Rooms.
- Sept. 28 (Thu.). Permanent Way Institution, Nottingham & Derby section. Demonstration of track tools and equipment. Derby.
- Sept. 30 (Sat.). Talyllyn Railway Preservation Society. Talyllyn Special, 1961. Paddington, 8 a.m.

OFFICIAL NOTICES

For Sale on Behalf of the Malayan Railway Administration

ONE Automatic Electric Post Heating Unit made by A.I. Electric Welding Machines Limited, England. Suitable for normalising welded rail joints in sections up to 100 lb. weight. Arranged for operation from air supply at 80/100 lb. p.s.i. and electrical supply of 400V. three-phase, 50-cycles A.C. Full details from The Crown Agents, 4, Millbank, S.W.1., England. (Quote W10/Sales 2020.)

GOVERNMENT OF INDIA MINISTRY OF RAILWAYS (RAILWAY BOARD) TENDER No. GP-25 of 1961

THE Ministry of Railways (Railway Board), propose to obtain from established and reliable manufacturers:—

Tyres for Rolling Stock—40,000 Nos. (Approx.)
Axles for Rolling Stock—14,000 Nos. (Approx.)
Wheels for Rolling Stock—6,000 Nos. (Approx.)
Tender documents are obtainable from the office of the undersigned Director General, India Store Department, Government Building, Broomfield Avenue, Acton, London W.3, and Director, India Supply Mission, 2536, Massachusetts Avenue, N.W. Washington 8 D.C. on payment of Rs. 5/- (7/6d.) per set. Complete set of Drawings can be had on additional payment of Rs. 60/- (£4.10.0) per set from this office only. Offers should reach the undersigned not later than 12 noon on 4th October, 1961.

G. P. Bhalla,
Director, Railway Stores,
Railway Board, Rail Bhavan,
Raisina Road, New Delhi.



TIMKEN
tapered roller bearings

This advertisement appeared in
The 'Railway Gazette'

September 16th
1955

Fourteen in a row

This illustration is unusual and interesting. It shows the wheelsets of a Class 59 Beyer-Garratt locomotive built by Beyer, Peacock & Co. Ltd. for the East African Railways. The wheel arrangement is 4-8-2+2-8-4 and every axle runs in a Timken cannon box.

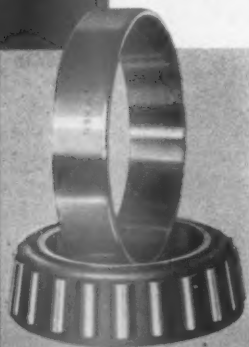
This is the first locomotive in the world to be equipped with cannon boxes on all axles.

The cannon boxes are of the well-known split type, providing for easy inspection of the axle and bearings, and having the characteristic advantage of widespread and positive alignment of the two Timken tapered roller bearings.

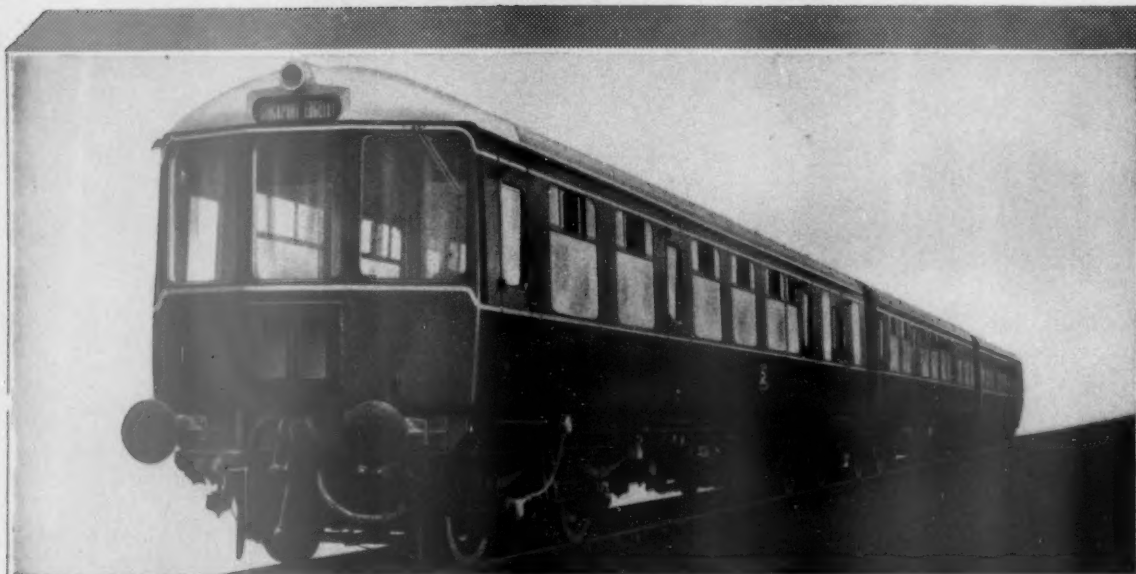
...and now, the Main Crank Pins

Following their five years' successful experience with Timken bearings on the Class 59 Beyer-Garratt Locomotives, the East African Railways have recently placed an order for 25 sets of Timken bearings for the four main crank-pins on these locomotives. The bearing installation was designed to utilize the existing coupling and connecting rods.

British Timken, Duston, Northampton, Division of The Timken Roller Bearing Company. Timken bearings manufactured in England, Australia, Brazil, Canada, France and U.S.A.



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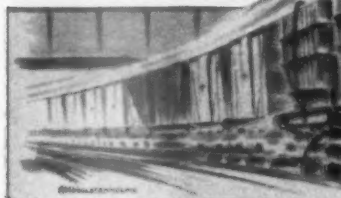
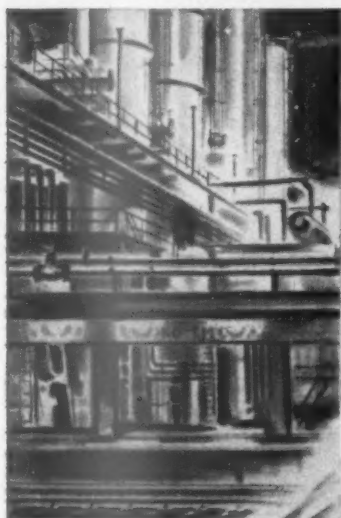
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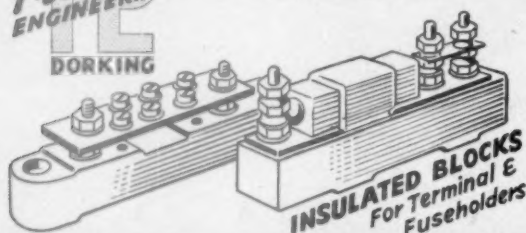


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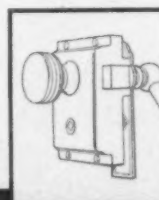
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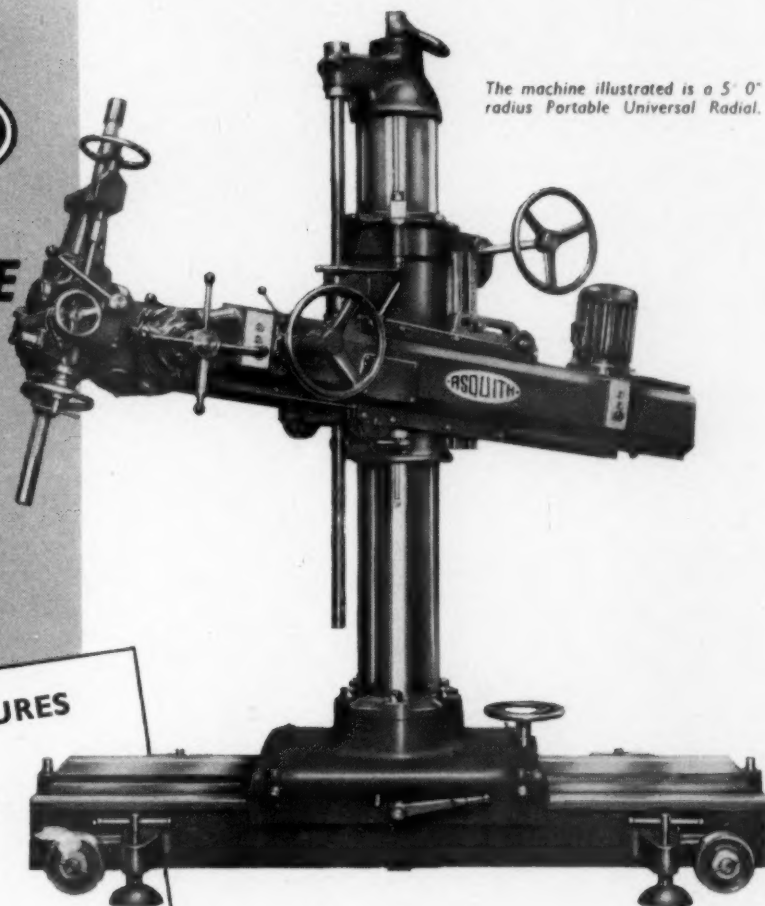
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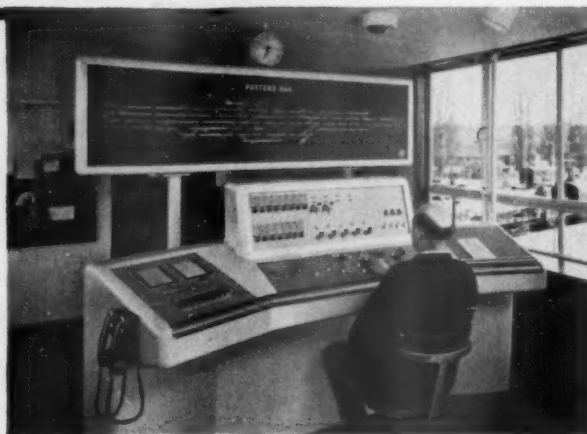
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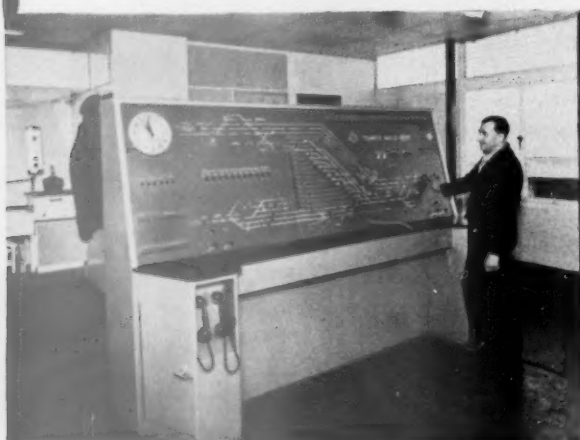
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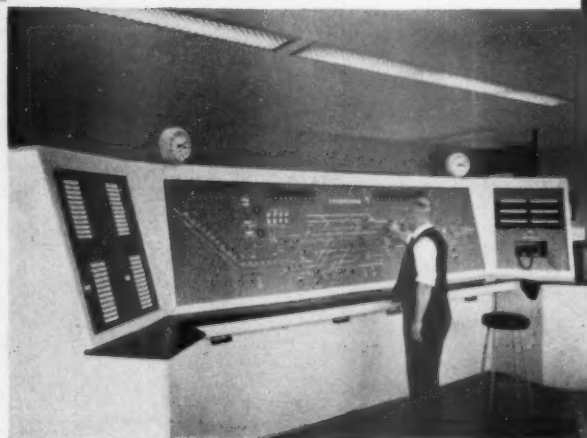


1 Console and illuminated diagram installed at Potters Bar, British Railways, Eastern Region.

2 Control panel at Temple Mills West, British Railways, Eastern Region, operating signalling and interlocking for the west end of Temple Mills Marshalling Yard.

3 Control panel at Faversham, British Railways, Southern Region, controlling signalling at Faversham Station and the junction for the Canterbury, Margate and Ramsgate lines.

Photographs by courtesy of British Railways.
For further details of the above installations, write to the address below:



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